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THE NATIONAL CYCLOPÆDIA

OF

USEFUL KNOWLEDGE.

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THE

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A.

A, the first letter of the alphabet in the English language, and in many others. As a sound, its power in English is at least fourfold, as in the words *father, call, tame,* and *hat.* The first of these sounds is that which generally prevails in other languages. The modified pronunciation of the vowel in *tame* is partly due to the vowel *e* at the end of the word; in *call* and similar forms, the peculiarity arises from the letter *l*; so that the only true sounds of the vowel are perhaps the long sound in *father,* and the short one in *hat.*

The letter *a* is the most easily pronounced of the vowels, requiring neither the retraction of the lips like *i* (= *ee* in feet), nor their propulsion as in *u* (= *oo*).

1, *A* is readily interchanged with *o.* This is common between the German and English, as *kalt, cold; alt, old; falt, fold.* 2, *A* is also interchanged with *e.* Thus the Romans generally substituted an *a* in those German names which now begin with *e,* as Albis, Elbe; Amisia, Ems. 3, *A* is interchangeable with *i.* This is limited to the short vowels, as in the Greek negative prefix *ἀ-* contrasted with the Latin *in,* and the Latin *sine* with the French *sans.* [See I.] 4, *Au* is interchangeable with *o.* [See O.] 5. *Ai* is interchangeable with *a,* as in the Latin *lact, lactuca, factus, fames, panis,* compared with the French *lait, laitue, fait, faim, pain.* So the Latin *amas, amamus, amatis,* are contracted from *amais, amaimus, amaitis.* 6, *Ae* is interchangeable with *a,* as the ablative *musa* from *musae,* the imperative *ama* from *amae.*

A (in Music). [Diatonic; Gamut; Scale.]

A or AN, the Indefinite Article. *A* is used before a consonant, *an* before a vowel. Thus we say *an emperor, a king.* Sometimes a virtual consonant exists at the beginning of a word without being written, as in *union* and *once,* which are pronounced with the initial sounds of *y* and *w, younion* and *wunce.* Before such words it is customary to drop the final letter of the article, at least in pronunciation, and there can be no good reason for not writing *a union, a once beloved monarch.* On the other hand, whenever *h* is mute, we should retain the *n* both in writing and speaking; thus, *a history,* but *an historical work.*

AALBORGS AMT.

That *an* and not *a* is the primitive form of the article, is proved by the Anglo-Saxon *an* and the German *ein;* indeed our own numeral *one* is only another and fuller form of the same word. In such phrases as *three shillings a pound,* the article evidently has this meaning. The double shape of our article has led to a corrupt mode of writing certain words; thus from *an eft* was deduced *a neft, a newt.* The letter *a* often appears prefixed to nouns so as to constitute a kind of adverb, as *afoot, aside, aboard, now-a-days,* &c. These, as Horne Tooke observes, are all abbreviations of *on fote, on syde, on borde, now-on-daies,* &c., which thus occur in our old English poets. This *on* is an Anglo-Saxon preposition with the meaning of *in.* In many words now in use, the *a* in the beginning takes the place of *on.* Alive, for instance, means on life, *i. e.* in life. 'So he fell asleep,' in the old translation of the New Testament is, *he fell on sleep.* The *a* formerly often prefixed to our participles in *ing,* both in the active and passive sense, as *the house is a-preparing, he is gone a-walking,* has the same origin.

AA, the name of several small rivers, five of which belong to Germany, five to Switzerland, three to Flanders, one to Russia in Europe, and one to France. The French Aa, one of the largest of these rivers, belongs to the department of the Pas-de-Calais. [Pas-de-Calais.]

AACH, the name of a small river and a small town in the grand duchy of Baden. The town of Aach is situated near the source of the river, and has between 500 and 600 inhabitants. The river falls into the Bodensee, or Lake of Constance.

AACHEN, the German name of Aix-la-Chapelle.

AALBORG, the principal town of Aalborgs Amt, in North Jutland, is situated on the south side of the channel of the Lümfiord, in 57° 5′ N. lat., 9° 55′ E. long. The harbour admits vessels drawing ten feet of water, and has a considerable trade in grain and herrings. The town is the seat of a bishop, and has a cathedral. The population is from 7500 to 8000. Aalborg means Eel-Town.

AALBORGS AMT, the most northern of the

four divisions into which Jutland is divided. [JUTLAND.]

AAR, the principal branch of the Rhine in Switzerland. [AARGAU.]

AARAU, the principal town of the canton of Argau. [AARGAU.]

AARD-VARK (*Orycteropus Capensis*, Geoffroy). The Dutch colonists of South Africa have given the name of Aard-Vark, or Earth-Hog, to a singular quadruped of the order Edentata. This animal constitutes, as far as is at present known, the sole example of the genus Orycteropus of M. Geoffrey St. Hilaire, though it is not improbable that other species may be discovered. The teeth of an animal, combined with its general form, will always afford us an index of its habits and diet; and on looking at the aard-vark, we perceive at once that it is burrowing and insectivorous. The form of this animal is elongated, but its proportions are thick and strong; its limbs are short, massive, and extremely muscular; the fore limbs are furnished with four stout toes, armed with large solid hoof-like nails, admirably adapted as scrapers of the dry hard ground, or as instruments for tearing open the solid mud-houses of the termite ants, on which it feeds. The hind feet are long and plantigrade (that is, with the whole sole applied to the ground); they are furnished each with five toes, armed with nails of a similar character to those of the fore feet.

The Aard-Vark.

The head is elongated, and the muzzle is hog-like in general appearance, slender and tapering; the mouth is small, and the tongue is slimy and extensible; the eyes are rather small; the ears are large, long, and pointed; the tail is of considerable length, and tapers gradually from a very thick and solid base. Unlike the armadillo, the aard-vark is not protected by scales or plates, but by a thick, tough, coarse skin, covered with harsh, wiry, greyish-brown hair, somewhat scantily disposed, especially about the head, and resembling bristles in quality. In the structure of its teeth this animal differs from all quadrupeds; they consist of a cylindrical envelope, enfolding a vast number of minute canals, or capillary tubes, running longitudinally. Cuvier aptly compares them to small bits of common cane; they are well adapted for crushing soft insects, but not for masticating hard or fibrous food. They consist, in the upper jaw, of seven molars on each side, of which the first is minute and distant from the rest; in the lower jaw there are six on each side.

It may be deemed strange that an animal having teeth should be placed in an order termed Edentata (toothless quadrupeds), but other edentate species, as the armadilloes, &c., are also furnished with teeth. The term, we must observe, is to be taken in a qualified sense; for though some, as the anteaters and pangolins, are really destitute of these organs, others possess them, but with certain limitations as to arrangement and structure. There are none in the front or anterior part of the jaws; and they are peculiar in structure, wanting both enamel and the distinctive portion called the neck.

The aard-vark attains to a considerable size, measuring when fully grown upwards of five feet in total length, of which the tail is one foot eight or nine inches. In its habits, as already stated, this animal is burrowing; it excavates superficial galleries in which it remains during the day, but comes forth on the approach of dusk; attentive to every noise, and taking alarm on the least appearance of danger. In some districts the burrows of the aard-vark are very numerous, and not unfrequently prove the source of accidents to waggons or travellers on horseback passing over them; the wheels of the waggon, or the foot of the horse, will break them in, and an overturn or fall is the consequence. So rapidly does the aard-vark carry on its mining operations, that the labour of digging one out of its subterranean retreat is incredible: it works more rapidly than the spade, and as its senses of hearing and of smell are acute, it takes immediate warning when any attempt is made to dislodge it, and burrows onwards and more deeply, exerting its vast muscular powers to the utmost.

Wherever the large dome-like or pyramidal structures of the termite ant are assembled on the karroos, or plains, of Southern Africa, there will be found the burrows of the aard-vark. These burrows abound in the districts of the zaureveldeu (so called from producing a kind of sour grass), and on the approach of night the animals which lurk in them during the day sally forth in quest of food. Innumerable are the gigantic ant-hills; and though their outer crust is so indurated that the weight of a waggon will scarcely crush it in, it is easily penetrated by the aard-vark, who scrapes a hole with its hard and powerful claws, so as to gain access to the many-chambered interior. This hole is just sufficient to admit the long snout of the aard-vark; and now, having ascertained that there is no danger of interruption, he lies down, his snout buried in the interior of the nest, and his long slender tongue, covered with glutinous saliva, actively employed in transferring the insects to his mouth by whole scores at a time. If uninterrupted, he continues this process till he has satisfied his appetite, but on the slightest alarm he makes a precipitate retreat, and seeks security at the bottom of his subterranean dwelling. Hence it is that these animals are seldom seen even in those parts of the country where they are most numerous. Like other nocturnal animals which pass the greatest part of their lives in sleeping and eating, they become exceedingly fat, and their flesh is considered to be a wholesome and

palatable food. The hind quarters, particularly when cut into hams and dried, are held in great esteem, and are much sought after by colonial epicures.

The aard-vark is extremely timid, and slow on foot; nor is it, like some edentata, very retentive of life, being easily despatched by a slight blow over the snout. Its food consists exclusively of ants and termites, which are extremely nutritious, their bodies being large, soft, and unctuous; indeed, the termites are esteemed as food even by the Hottentots; and Patterson affirms that prejudice alone prevents the Europeans from making a similar use of them. Their importance in fattening poultry is well understood at the Cape, and the farmers collect them by bushels for this purpose: this is not a work of difficulty, for in some parts of Southern Africa their mounds may be seen extending over the plain as far as the eye can reach; and in these districts the aard-vark is always abundant. It is called *innagu* by the Korah Kaffers, and *goup* by the Hottentots.

AARD-WOLF (*Proteles cristata*), *Aard-Wolf*, or Earth-Wolf of the Dutch colonists of the Cape; *Viverra cristata*, Sparrman; *Proteles Lalandii*, Isidore Geoffroy; *Viverra hyænoides*, Desmarest; *Civette hyénoïde*, F. Cuvier. The genus *Proteles* appears to be an intermediate link between the hyænas and civets; it contains, as far as is at present known, only one species, which is a native of South Africa. In general form and appearance, the Aard-Wolf greatly resembles the hyæna, excepting that it is very much smaller than any species of those animals; nevertheless, as in them, the hinder quarters are low and trailing, the shoulders thick and muscular; while a full coarse mane runs along the spine; so that at first sight the animal might be taken for a young striped hyæna, the more so as it closely resembles that animal in the colours and markings of the fur.

The dentition of the Aard-Wolf is peculiar. The molars are four on each side above, and three on each side below, much separated from each other. Of those above, the three first are false, and the fourth is small and tuberculous with three points. The three molars below have each the character of false molars. Incisors and canines as usual. Frederick Cuvier was acquainted with the dentition of this animal only in its immature condition. With respect to the toes, there are five on the fore feet; but the thumb is short, rudimentary, and high on the carpus, as in the dog; the hinder feet have each four toes. The claws are stout, large, blunt, and well adapted for scratching. The feet are truly digitigrade. There are no decided subcaudal scent-pouches as in the civets, but a furrow in their stead.

In the form of the head, this animal more resembles the civets than the hyænas; it is somewhat elongated, with a pointed and conical muzzle; the ears are long, erect, acute, and thinly covered with hair; the whiskers are strong; the tail is short and bushy, with coarse hair. The body is covered with woolly fur, mixed with coarse grey hairs; the general colour is of a yellowish grey, with distinct transverse stripes of dusky black; the mane is waved with black, and this is also the colour of the feet and the extreme half of the tail. The young are much darker, both in general colour and their marking, than adults. The length of an adult female specimen (exclusive of the tail) which we have examined, was two feet six inches; that of the tail eleven inches. The male is somewhat larger.

The Aard-Wolf is nocturnal in its habits, and constructs a subterranean burrow, at the bottom of which it lies concealed during the day-time, only venturing abroad during the night. It is partially gregarious, several individuals being the tenants of the same burrow, which has usually three or four distinct entrances, in order to facilitate escape under circumstances of danger. Notwithstanding the trailing of the hind quarters, the Aard-Wolf runs with considerable quickness; when irritated, it erects its mane like the hyæna; in its disposition it is very wary and cautious. Its food consists of carrion and small animals, not excluding ants, which were found by Sparrman in the stomach of one he killed. It is described by this traveller as the *Viverra cristata* (English Translation of Sparrman's Travels, vol. ii. p. 177); it is the *Loup de Terre* of Le Vaillant (Second Voyage, vol. ii. p. 360).

AARGAU (*Argovie* in French), one of the twenty-two Swiss cantons. On the north the Rhine separates it from the grand duchy of Baden; the canton of Bâle bounds it on the west, that of Zurich on the east, and that of Luzern on the south. It takes its name from the river Aar, which rises in the glaciers that form the southern limits of the canton of Bern; and, after flowing through the lakes of Brienz and Thun, and past the towns of Bern, Soleure, and Aarau, falls into the Rhine on the south bank, about fourteen miles above Laufenburg. The whole length of its course is about 160 miles. *Aar-gau* signifies the province or district of the Aar.

The canton of Aargau is a pleasant and in many parts a fertile district, diversified by hills, mountains, and valleys. The chain of the Jura mountains runs through part of the canton, but they hardly attain the height of 3000 feet. The number of inhabitants is about 158,000, and the area about 700 square miles. The chief town is Aarau, on the east bank of the Aar, which contains 4500 inhabitants, and has manufactures of silk, cotton, and leather. Aargau contains several small but industrious towns; among which are Aarburg, with 1,500 inhabitants, Baden, with 1,800, Brugg, the birth-place of Zimmermann, with 800, Laufenburg, with 900, and Lenzburg, with 2000. The canton of Aargau is divided into eleven districts and forty-eight circles.

AARHUS AMT, one of the four divisions into which Jutland is divided. [JUTLAND.]

AARHUS, the principal town of Aarhus Amt, is situated on the east coast of Jutland, in 56° 10′ N. lat., 10° 15′ E. long. The town contains about 7000 inhabitants, and is tolerably well built; it is the seat of a bishop, and has a large

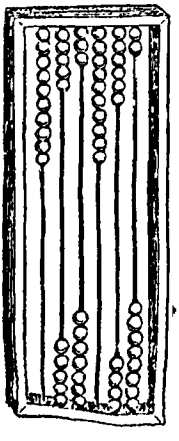
cathedral. The harbour is small, but safe and convenient.

AARON, the first high-priest of the Jews. The history of Aaron is to be found in the book of Exodus, and the three following books of the Pentateuch. He was the elder brother of Moses, and by the divine command became his associate in the deliverance of his countrymen from Egyptian bondage, attesting his mission by the series of miracles recorded in the book of Exodus. During the sojourn in the wilderness Aaron exhibited infirmities of character, which were in striking contrast to the courage and fortitude of Moses; but he was consecrated to the priesthood, which was made hereditary in his family. Aaron was not permitted to reach the promised land. On the summit of Mount Hor he was stripped by Moses of his priestly robes, which were put on his eldest son Eleazar, and there he died, in the year 1451 B.C. according to the commonly received chronology.

AB (Hebrew Month). [YEAR.]

A'BACUS, in architecture, is the level tablet, whether square or oblong, which is almost always formed on the moulded or otherwise enriched capital of a column, to support the horizontal entablature.

A'BACUS, an instrument employed to facilitate arithmetical calculations. The name may be given with propriety to any machine for reckoning with counters, beads, &c., in which one line is made to stand for units, another for tens, and so on. We have here given the form of an abacus, such as may be used for the purpose of teaching the first principles of arithmetic, the only use, as far as we know, to which such an instrument is put in this country. It consists of a frame, traversed by stiff wires, on which beads or counters are strung so as to move easily. The beads on the first right hand row are units, those on the next tens, and so on. Thus, as it stands, the number 57048 is represented upon the lower part of it.



ABANDONMENT is a term used in marine insurance. Before a person who has insured a ship or goods can demand from an insurer or underwriter the stipulated compensation for a total loss of such ship or goods, he must *abandon* or relinquish to the insurer all his interest in any part of the property which may be saved.

ABA'NO, PIE'TRO DI, or *Petrus Apo*[illegible]*s*, was born in 1250, at Abano, the Roman name of which was Aponus, a village which is 5½ miles from Padua. He studied first at Padua, then went to Constantinople to learn Greek, and afterwards to Paris, where he devoted himself to mathematics and medicine. He travelled in England and Scotland, whence he was recalled to Padua in 1303 or 1304 to take the professorship of medicine, then vacant. His reputation was very great, and his charges for attendance very high. He combined astrology with astronomy, and perhaps made some pretence to magic. At all events he was regarded as a magician, and in 1306 he was brought before the tribunal of the Inquisition as a heretic and atheist; but defended himself so well as to obtain an acquittal. In 1314 he removed to Treviso, in compliance with the invitation of the inhabitants. In 1315 another accusation was brought against him before the Inquisition; but he died before the inquiry was completed, in the year 1316, at the age of 66. His judges, however, continued the inquiry after his death, found him guilty, and ordered his body to be burnt. Abano wrote several works on philosophy and medicine, and made translations of ancient and Arabic medical writers. In his expositions there is little of his own observation or of original thought; but in the knowledge acquired from the works of others he was not surpassed by any physician of his time.

ABATEMENT is a word derived from the old French word *abater*, which signified to beat down, prostrate, or destroy.

The word Abatement is used in its literal sense when we speak of abating or *beating down* a nuisance. Whatever unlawfully annoys, or does damage to any person, is a nuisance, which he may abate, that is, beat down and remove: provided he commits no breach of the peace, and does no more injury to the thing than is necessary for effecting his purpose. If a new house or a wall be erected so near to an old house as to obstruct its ancient lights, this is a private nuisance, which the person injured may peaceably abate. If a gate or other obstruction be placed across a public road, this is a public nuisance, and any person may beat down and remove it.

Another signification of Abatement is that of abating a civil action, or an indictment. Here it is taken figuratively, and signifies the beating down or overthrowing such action or indictment. This is effected in an action at law, either by showing by way of plea, that something has occurred by which the proceeding is determined (ended), or by stating some matter which renders it the duty of the court to put an end to the proceedings. Thus, in the first case, it may be alleged that the plaintiff has taken possession of the property which he seeks by his suit to recover from the defendant. In the second case, it may be shown that the plaintiff in such proceedings is an outlaw, or an attainted person, or otherwise incom-

petent to maintain an action; that the defendant is privileged from action, or has been misnamed in the suit; or that there are other persons still living who are equally liable with the defendant, and ought to be joined with him in the demand. It is a rule that where the action is only abateable by plea, he who takes advantage of a flaw must, at the same time, show how it can be amended. This is, of course, not required where the action is actually abated, and where the plea, though in form a plea in abatement, is substantially a plea in bar, and shows, not that the particular proceeding is misconceived, but that the plaintiff has no right to recover by his action the thing which he has claimed.

The subjects of pleas in abatement in criminal proceedings, are much more confined than in civil actions. In general, if an indictment assign to the defendant no Christian name or a wrong one, no surname or a wrong one, or no addition, or description of his calling and place of abode, or a wrong one, he may plead this matter in abatement. In modern times, however, misnomer is the only case in which a plea in abatement to an indictment has been usual in practice; and, at the present day, such a plea would be of no avail to a defendant, for a statute (7 Geo. IV. c. 64, s.10) gives authority to the courts to amend the indictment according to the truth upon such a plea being made, and then to call upon the party to plead to the substance of the charge.

(Bacon's *Abridgment;* Blackstone's *Commentaries,* vol. iii. p. 301; vol. iv. p. 334; Stephen on *Pleading.*)

In suits in equity, if a plaintiff dies, or a female plaintiff marries, as a general rule, the proceedings are thereby abated; and if a defendant dies, the proceedings as to him are abated. Whenever the interest of the person who dies survives to those who represent him, the suit may be continued by bill of revivor.

It is 'an abatement when a man dies seised of an estate of inheritance, and, between the death and the entry of the heir, a stranger doth interpose himself and abate.' (Co. Litt. 277, a.) This entry of a stranger on the lands is an abatement. The true owner can only recover the seisin by entry; and if the abator dies seised, the land will descend to his heir, but the right of entry or action of the true owner will still subsist. (3 & 4 Wm. IV. c. 27. s. 39.)

ABATEMENT OF LEGACIES. [LEGACY.]

ABA'TI, or ABBA'TI, NICCOLO', was born at Modena in 1512. He executed in fresco the Adventures of Ulysses, and other works, from the designs of Primaticcio, for the Palace of Fontainebleau, the decoration of which was intrusted to Primaticcio after the death of Il Rosso. Prints from the Adventures of Ulysses, by Van Thulden, were published in Paris in 1630, but the original works were destroyed when the building was reconstructed.

Abati's own works, however, in Modena and Bologna, were productions of the greatest merit, according to the Carracci; but there are few of them remaining, and these are chiefly frescoes, in which he had surprising facility.

Of his works in the Institute of Bologna, Zanotti has written an account: 'Delle Pitture di Pellegrino Tibaldi e Niccolò Abati,' &c., in which there are engravings of them: Malvasia also has given a laudatory description of them: they have been compared with the works of Titian. The Nativity of the Leoni Palace, which has been engraved by Gandolfi, is mentioned in the highest terms by Count Algarotti, who discovered in it 'the symmetry of Raphael, the nature of Titian, and the grace of Parmegiano.' Of his easel pictures in oil the most celebrated is the Martyrdom of St. Peter and St. Paul, a large picture on wood, which was painted for the Church of the Benedictines at Modena, in 1546. It is now in the Dresden Gallery, and has been engraved by Folkema for the 'Recueil d'Estampes après les plus célèbres Tableaux de la Galerie de Dresde.'

From about 1546 till 1552, when he accompanied Primaticcio to France, Abati lived in Bologna, and his Bolognese works were painted during this interval. He died in Paris in 1571.

Several of Abati's relations also distinguished themselves as painters: his brother Pietro Paolo was a clever horse and battle painter; his son Giulio Camillo, his grandson Ercole, and his great-grandson Pietro Paolo the Younger, were all painters of ability, especially Ercole, who was born at Modena in 1563, and died in 1613; he executed, with B. Schidone, the frescoes of the Council-hall of Modena.

(Vedriani, *Vite de' Pittori Modenesi;* Tiraboschi, *Notizie de' Pittori, &c. di Modena.*)

ABATIS, in the military art, is a number of felled trees having the smaller branches only cut off, which are placed side by side, with their butt-ends towards the defenders. An abatis serves as an obstacle to the advance of an enemy, being in front of a line of troops, and frequently between redoubts of earth formed at intervals: it is also disposed about a weak part of a field-work, in or beyond its ditch, for a like purpose. The trees are picketed to the ground, and the approach to them should be defended by a flanking fire from collateral works.

ABATTOIR, the name given by the French to the public slaughter-houses which were established in Paris, by a decree of Napoleon, in 1810, and finished in 1818. There are three on the north side of Paris, and two on the south side, not far from the barriers, and about two miles from the centre of the city. The cattle *markets* for the supply of Paris are several miles distant, and the cattle are driven from them round the exterior boulevards to the abattoirs, and consequently do not enter the city. At one of the abattoirs each butcher has his slaughter-house, a place for keeping the meat, an iron rack for fat, pans for melting it, and a place with convenience for giving cattle hay and water, and where they may be kept before being slaughtered. A fixed sum is charged for this accommodation, and in 1843 the fee was 6 francs for each ox, 4 francs for a cow, 2 francs for a calf, and 10 cents for a sheep. The income of the establishment, arising from these fees, the sale of manure, &c., was above 48,000*l.* in 1842. An inspector is appointed at each abattoir, and

means are taken to prevent unwholesome meat being sold. There are slaughter-houses under public regulations in most of the continental cities; and those of New York and Philadelphia, and some other of the cities of the American Union, are, it is said, placed on a similar footing.

The great cattle-market in Smithfield, for the supply of London, existed above five centuries ago, but the spot was then a piece of waste ground beyond the city, instead of being, as at present, surrounded by a dense population. The cattle sold in Smithfield Market amount annually to about 180,000, and the sheep to about 1,500,000, and at least this number are annually slaughtered within the limits of the metropolis. There are slaughtermen who kill for other butchers frequently above a hundred head of cattle, and perhaps five or six hundred sheep every week; many butchers kill for themselves to a considerable extent, and there are few who have not accommodation for slaughtering and dressing a few sheep, either in the cellar underneath their shop, or in the rear of their premises. The slaughter-houses, for sheep, in Newgate Market, many of which are in cellars, and in Warwick Lane, are close to Newgate Street, and within a hundred and fifty yards of Ludgate-Street, two of the great thoroughfares of London. The fear of creating a nuisance, is in some measure a substitute for the vigilant inspectorship maintained in the public slaughter-houses on the continent, and those who slaughter cattle know that in proportion as their establishments are cleanly and well ventilated, it is easier to keep the meat in a proper state; but the ignorant, the careless, and those who cannot afford to improve the accommodation and convenience of their slaughter-houses, ought to be placed under positive regulations.

ABAUZIT, FIRMIN, was born November 11, 1679, at Uzès in Languedoc, of Protestant parents in good circumstances. In 1685, after the revocation of the Edict of Nantz, he and his brother were seized by the authorities for the purpose of being educated in the Catholic faith. In 1689 his mother was enabled to effect their escape, and to send them to Geneva. For this she was imprisoned, until she also contrived, after two years' confinement, to escape and follow her sons. Abauzit applied himself closely to study, and made rapid progress in almost every branch of human knowledge. In 1698 he visited Germany, Holland, France, and England. He returned to Geneva, where he resided during the remainder of his life, in great esteem with his fellow-citizens, and with a high reputation among foreigners. There he took part in the translation of the New Testament, which appeared in 1726, and received the thanks of the clergy for his exertions. The Academy offered him a professor's chair in 1723, which he declined, preferring the situation of a supernumerary librarian, without salary. He died March 20, 1767, in his 88th year.

Abauzit's reputation rests not so much on the works which he published as on the opinions of the most distinguished men of the age in which he lived. Sir Isaac Newton, Pococke, Voltaire, Rousseau, and many others, expressed the highest admiration for his extensive acquirements and extraordinary power of memory. His religious opinions were unitarian. In his disposition he was unusually mild and patient. He published little. He contributed to the new edition of Spon's "Histoire de la Ville de Genève" and to the "Journal Helvetique," and other periodical works. Some of his religious works were published after his death, but others were destroyed by his heirs, whose religious opinions differed from those of Abauzit.

(Senebier, *Histoire Littéraire de Genève*, tom. iii.)

ABBA'S I. (Shah), king of Persia, commonly called Shah Abbas the Great, was born A. D. 1557. He was the son of Mohammed Mirza, and grandson of Tahmasp, who died in 1576, when the throne was usurped successively by Hayder Mirza and Ismail Mirza, two younger sons of Tahmasp; but Hayder having been assassinated and Ismail having died, Mohammed, the eldest son, succeeded to the throne in 1577. Mohammed was weak in mind as well as body, and after reigning five years, Abbas was proclaimed king in 1582 by the discontented nobles, and compelled to fight against his father. The contest lasted till 1585, when Mohammed was deserted by all his troops, and Abbas continued in possession of the throne, while his father remained in obscurity, and soon afterwards died. Khorassan had been occupied by the Usbeks, and it was the first object of Shah Abbas to recover possession of it. But his efforts proved for a time ineffectual. The year 1590 was distinguished by victories in Ghilan and Azerbijan over the Turks, who had collected a considerable force on the banks of the river Kur, and threatened Persia with an invasion. The Turks lost, through this campaign, their influence in Ghilan, but retained for the present possession of the fortresses of Nuhavend, Tabriz, Tiflis, and almost the whole of Azerbijan and Georgia. During this time, one of the generals of Abbas conquered the province of Lar in the south, and the Bahrein islands in the Persian gulf, important on account of their pearl-fishery.

The Usbeks still remained masters of Khorassan, and, owing to their desultory mode of carrying on their attacks, many attempts at bringing them to a regular action had failed. At last, however, in the year 1597, they were totally defeated by the Persian troops, near Herat, and Khorassan was for a long time released from their predatory incursions.

Two English knights, Sir Anthony Shirley and his brother Sir Robert Shirley, arrived in 1598 as private travellers in Persia. They were honourably received by Shah Abbas, whose confidence they soon gained to such a degree, that while Sir Robert Shirley remained in Persia, his brother Sir Anthony was sent in 1599 as envoy from the Persian court to the Christian princes of Europe, to offer them the Shah's friendship, chiefly with a view to some combination against the Turks. [SHIRLEY.]

Hostilities were still carried on between Persia and Turkey with doubtful results till 1605, when the Turks were defeated in a great battle, Shah Abbas regained all the provinces he had lost, and his enemies were ever afterwards kept in check.

The Turks, however, formed a league with the Tartars of Kaptchak, but the united forces of both were vanquished in a battle fought between Sultanieh and Tabriz in 1618, the last memorable battle that occurred during the reign of Shah Abbas.

Shah Abbas encouraged the trade of Europeans with Persia: he protected the mercantile establishments which the English, French, and Dutch had at Gombroon; but he looked with jealousy on the flourishing establishment of the Portuguese on the small island of Ormuz, near the entrance of the Persian Gulf, which had been in their possession ever since 1515, when Alfonso Albuquerque occupied it. This settlement the Persians and the English East India Company attacked, the English furnishing the naval forces and the Persians the military, and the island was taken on the 22nd April, 1622.

After a reign of upwards of forty years, Shah Abbas died at Casbin in 1628. Shah Abbas was cruel, and hasty in awarding capital punishment often on very slight grounds. All his sons fell victims to his suspicion and jealousy. Only one grandson survived him, who succeeded him on the throne as Shah Sufi. He made Ispahan the capital of his kingdom, and that city is chiefly indebted to him for its extension and embellishment. He favoured commerce, established an effective police, and extended the territories and promoted the prosperity of Persia.

(Malcolm's *History of Persia.*)

ABBASIDES. The name of this family of sovereigns is derived from their ancestor, Abbas ben Abd-al-Motalleb, a paternal uncle of the prophet Mohammed. On account of their descent from so near a relation of the prophet, the Abbasides had, ever since the introduction of the Islam, been held in very high esteem among the Arabs, and had at an early period begun to excite the jealousy of the Ommaïade caliphs, who, after the defeat of Ali ben Ali Taleb, the son-in-law of Mohammed (A. D. 661), occupied the throne of the Arabian empire. The Abbasides had already for some time asserted their claims to the caliphat, in preference to the reigning family, when, in 746, they formed a strong party, and commenced open hostilities against the government of the Ommaïades in the province of Khorassan. Three years afterwards (A. D. 749) the Abbaside Abul-Abbas Abdallah ben Mohammed, surnamed Al-Saffah, or 'the bloodshedder,' was recognized as caliph at Kufa. A battle on the banks of the river Zab, not far from Mosul, in Jan. 750, decided the ruin of the Ommaïades. Merwan II., the last caliph of that lineage, fled before the advancing forces of Al-Saffah from Mosul to Emesa, thence to Damascus, and finally to Egypt, where he was overtaken and killed. So great was the hatred of the victorious party against the vanquished royal family, that not less than ninety Ommaïades were doomed to a cruel and ignominious death. A survivor of the fallen dynasty, Abd-el-rahman, a grandson of the caliph Hesham, escaped to Spain, the westernmost province of the Arabian empire. There his name procured him a favourable reception; he was saluted as king, and an Ommaïade lineage continued to reign for nearly three centuries (A. D. 756–1031) over the eight Mohammedan provinces of Spain. [Moors.]

Al-Saffah died in 753, and was succeeded in the caliphat by his brother Al-Mansur (A. D. 753–774), who removed the seat of government from Damascus to the new-built city of Bagdad. He was successful in his wars with the Turcomans, and with the Grecian empire in Asia Minor: but the internal tranquillity of his reign was often disturbed by insurrections in the distant provinces. In the reign of his son, Modhi (A. D. 774–784), a Mohammedan army, under the command of the youthful Harun al-Rashid, penetrated the Grecian provinces of Asia Minor as far as the Hellespont. During the short reign of Mohdi's son, Hadi (784–786), an attempt at an overthrow of the Abbaside dominion was made at Medina, by Hossein, a descendant of Ali ben Abi Taleb.

Hadi was followed by the celebrated Harun al-Rashid, a grandson of Al-Mansur. When called to the throne, he soon displayed a love of justice and peace, and a zeal for literature and the arts, which corresponded to his valour as a military commander. He opened friendly communications with Charlemagne: the presents which he sent him (among others a curious sort of clock) afford an illustration of the progress which the mechanical arts had made among the Arabs. The epoch of Harun's reign has, in the remembrance of Mohammedan nations, become the golden age of their dominion. The wealth, luxury, and splendour of the court of Bagdad are exhibited in many of the 'Arabian Nights.' Flourishing towns sprung up in every part of the empire; traffic by land and by sea increased; and Bagdad rivalled even Constantinople in magnificence.

According to the ancient Persian plan, the several provinces of the empire were governed by delegates, with military and administrative powers. But this system soon proved fatal to the caliphat: for the lieutenants in the distant parts of the empire often revolted and aspired to independent authority. On an expedition to Khorassan, undertaken against a disloyal lieutenant, Harun died at Tus, A. D. 808.

The throne was for some years contested between his two sons, Amin and Mamun: but, in A. D. 813, Mamun obtained the sole and undisputed possession of it. His reign (A. D. 813–833) forms an important epoch in the history of science and literature, the cultivation of which was conspicuously patronized by that caliph. Mamun founded colleges and libraries in the principal towns of his dominions, such as Bagdad, Bassora, Kufa, and Nishabur. Syrian physicians and Hindu mathematicians and astronomers lived at his court; and works on astronomy, mathematics, metaphysics, natural philosophy, and medicine were translated from the Sanscrit and Greek into Arabic.

The period of prosperity which the Arabic empire enjoyed under Harun al-Rashid and Mamun was only of short duration. The chivalrous enthusiasm with which Mohammed had

inspired his nation was soon extinguished by voluptuousness and the love of enjoyment. Many provinces in the west (Spain, Fez, and Tunis) had already shaken off their allegiance to the caliphat, and the attachment of others in the east was likewise doubtful. From the north the empire was threatened by the Turks, some tribes of whom had been compelled to adopt the Mohammedan religion. Turkish youths were soon brought as mercenaries to Bagdad, and Motasem (833–842), the brother and successor of Mamun, formed of them a body-guard, which, under the reign of Vathek (842–846), Motawakkel (846–861), and Montaser (861, 862), became to the caliphat what the prætorian guards had been under the Roman emperors. Mostaïn (862–866) was obliged to concede to them the privilege of electing their own commander, and thus lost much of his authority at home, while the provinces of his empire were subjected to invasions from the Greeks. Under his successor Motaz (866–868), a native of Sejestan, Yakub al-Laith, surnamed Al-Soffar, 'the brazier,' made himself master of Khorassan, Kerman, Persia Proper, and Khuzistan, and united these provinces into an independent kingdom, with Nishabur for its capital, which continued in the possession of his family (the Soffarides) till 917.

The successors of Motaz were Mohtadi (868, 869), Motamed (869–892), Motadhed (892–902), Moktafi (902–907), Moktader (907–932), and Kahir (932–934). Under the reign of Rhadi (934–940) the disorder of the empire had reached such a height, that the caliph, in order to restore public order and tranquillity, was obliged to call Mohammed ben Rayek, the governor of Wasith, to Bagdad, and to confide to him, with the title of Emir al-Omara, or commander of the commanders, an almost unlimited authority in the government. From this time the caliphat became a mere nominal dignity; all the efficient power was in the hands of the mighty Emirs al-Omara. After the short reign of Mottaki (940–943), Mostakfi (943, 944) came to the caliphat; but he was soon dethroned by Moizzeddaula the Buide (properly Bawaihide), who, in concert with his two brothers, had rendered himself master of a great part of Persia and Irak. Moizeddaula conferred the caliphat, now limited to the mere pontifical dignity and to the possession of the town of Bagdad, on Mothi (946–973), and reserved to himself the powerful office of Emir al-Omara, which continued hereditary in his family during the caliphat of Tayi (973–991) and Kadir (991–1031), till the year 1056, when, in the caliphat of Kaïm (1031–1074), Bagdad was occupied by the Seljukes, under Togrul Beg, whose family retained the authority of Emir al-Omara till 1152, while the nominal sovereignty of the caliphat passed from Kaïm successively into the hands of Moktadi (1074–1094), Mostajer (1094–1118), Mostarshed (1118–1134), Rashid (1134–1135), and Moktafi (1135–1160). Moktafi's son Mostanjed (1160–1170) was succeeded in the caliphat by Mostadhi (1170–1179), and Nasir (1179–1226), during whose reign, the Tartars, under Gengis Khan, invaded Persia. Dahir occupied the caliphat only a few months. His successor, Mostanser (1226–1242), offered for a time a vigorous resistance to the advance of the Tartar conquest; but his son Mostasem was defeated and killed, in 1257, by the Tartar Hulaku, who took Bagdad, pillaged it for seven days, burnt it, and put an end to the government of the Abbasides.

ABBE' is the French term for Abbot. In France, before the Revolution, Abbé was the denomination of a very numerous body of persons, who had little or no connexion with the church except the appearance of connexion which they derived from this title. Many of them had not even received the tonsure, which in Roman Catholic countries is the first and indispensable mark of the clerical character. The abbés occupied a very conspicuous place in French society, and discharged a variety of functions, especially those of parasites in noblemen's and gentlemen's families. Many of the abbés, however, followed a more useful and creditable way of life. Some acted as private tutors in families; others were professors of the universities; and a great many employed themselves as men of letters, in which capacity their labours have given to the title of Abbé an honourable celebrity, and redeemed it from the universal contempt to which swarms of frivolous and intriguing sycophants would otherwise have reduced it.

ABBESS, the superior of a nunnery or other female religious community. An abbess, in the Roman Catholic Church, possesses, in general, the same dignity and authority as an abbott, except that she cannot exercise the spiritual functions appertaining to the priesthood. An abbess, for example, cannot confess her nuns, although, it appears, that in ancient times she was allowed to do so; but that practice was suppressed. According to a decree of the Council of Trent, it is recommended that an abbess, at the time of her election, should be at least forty years old, and have made profession for eight years; and it is forbidden that any person be elected to the dignity who has not been professed for five years, or is under thirty years of age.

ABBEVILLE, a town in France, in the department of Somme, is situated on the river Somme, in 50° 7′ N. lat. 1° 50′ E. long. Abbeville is a place of considerable trade, and has various manufactures, which include woollen stuffs, such as serges, barracans, &c., bed-ticking and linings, rope and twine. There is also a large woollen-cloth manufactory, established in 1665, by Van Robais, a Dutchman, who was patronized by Colbert. Dyeing and bleaching are also carried on. The Somme, at high water, is navigable up to the town for vessels of 150 tons. The population of the commune of Abbeville in 1841 was 16,932. The town is fortified, and has five gates. The houses are generally of brick, but there are in the narrow streets some interesting specimens of old timber houses. The west front and a portion of the nave of the cathedral of St. Wolfram are part of a magnificent design never completed: the façade is a

splendid example of the flamboyant gothic. Abbeville is 26 miles N.W. from Amiens, and 94 N.W. from Paris.

ABBEY (from the French *Abbaye*), a religious community presided over by an abbot or abbess. When the superior was denominated a Prior, the establishment was called a Priory; but there was latterly no real distinction between a priory and an abbey. The priories appear to have been all originally off-shoots from certain abbeys, to which they continued for some time to be regarded as subordinate. The terms Abbey and Priory are now commonly applied to the buildings formerly occupied by the religious communities.

In the early time of the French monarchy the term abbey was applied to a duchy or earldom, as well as to a religious establishment; and the dukes and counts called themselves abbots, although they remained in all respects secular persons. They took this title in consequence of the lands of certain abbeys having been conferred upon them by the crown.

ABBOT, the title of the superior of certain establishments of religious persons of the male sex, called abbeys. The word *abbot* or *abbat*, as it has been sometimes written, comes from *abbatis*, the genitive of *abbas*, which is the Greek and Latin form of the Syriac *abba*, of which the original is the Hebrew *ab*, father. It is, therefore, merely an epithet of respect, and appears to have been at first applied to any member of the clerical order, just as the French 'père,' and the English 'father,' which have the same signification, still are in the Roman Catholic church. In the earliest age of monastic institutions, however, the monks were not priests; they were merely holy persons who retired from the world to live in common, and the abbot was one of their number whom they chose to preside over the association. The general regulations for monasteries, monks, and abbots (Hegumeni) of the Emperor Justinian, in the sixth century, are contained in the Fifth of the 'Novellæ,' which form a part of the 'Corpus Juris.' In regard to general ecclesiastical discipline, all these communities were at this time subject to the bishop of the diocese, and even to the pastor of the parochial district within which they were established. At length it began to be usual for the abbot, or, as he was called in the Greek Church, the Archimandrite (that is, the chief monk), or the Hegumenos (that is, the leader), to be in orders; and since the sixth century monks generally have been priests. In dignity an abbot is considered to stand next to a bishop, but there have been many abbots in different countries who have claimed almost an equality in rank with the episcopal order. A minute and learned account of the different descriptions of abbots may be found in Du Cange's 'Glossary,' and in Carpentier's Supplement to that work. In England, according to Coke, there used to be twenty-six abbots (Fuller says twenty-seven), and two priors, who were lords of parliament, and sat in the House of Peers. These, sometimes designated sovereigns, or general abbots, wore the mitre (though not exactly the same in fashion with that of the bishops), carried the crozier (but in their right hands, while the bishops carried theirs in their left), and assumed the episcopal style of lord. Some croziered abbots, again, were not mitred, and others who were mitred were not croziered. Abbots who presided over establishments that had sent out several branches, were styled cardinal-abbots. There were likewise in Germany, prince-abbots as well as prince-bishops. In early times, we read of field-abbots (in Latin *Abbates Milites*), and abbot-counts (*Abba-Comites* or *Abbi-Comites*). These were secular persons, upon whom the prince had bestowed certain abbeys, for which they were obliged to render military service as for common fiefs. A remnant of this practice appears to have subsisted in our own country long after it had been discontinued on the Continent. Thus, in Scotland, James Stuart, the natural son of James V., more celebrated as the Regent Murray, was, at the time of the Reformation, prior of St. Andrews, although a secular person. And the secularization of some of the German ecclesiastic dignities has since occasioned something like a renewal of the ancient usage. We have in our day seen a prince of the House of Brunswick (the late Duke of York) at the same time commander-in-chief of the British army and bishop of Osnabrück. The efforts of the abbots to throw off the authority of the diocesans long disturbed the church, and called forth severe denunciations from several of the early councils. Some abbeys, however, obtained special charters, which recognized their independence, a boon which, although acquired at first with the consent of the bishop, was usually defended against his successors with the most jealous punctiliousness. Many of the abbots lived in the enjoyment of great power and state. In ancient times they possessed nearly absolute authority in their monasteries. The external pomp and splendour with which an abbot was in many cases surrounded, corresponded to the extensive authority which he enjoyed within his abbey and throughout his domains. Even in the unreformed parts of the Continent, however, and long before the French Revolution, the power of abbots and priors, as well as of bishops, had been reduced to comparatively narrow limits, and subjected in all material points to the civil authority.

ABBOT, CHARLES, [COLCHESTER, LORD.]

ABBOT, GEORGE, was born Oct. 29, 1562, at Guilford, in Surrey, where his father was a clothworker. George Abbot, and his elder brother, Robert, were put to the grammar-school of their native town, where George remained till he was entered a student of Baliol College, Oxford, in 1578. In 1583 he entered into holy orders; in 1593 he took the degree of B.D.; and in 1597 that of D.D., in which year he was elected Master of University College. After this he was also three times appointed Vice-Chancellor of the University. These academic honours seem to show that his reputation and influence at Oxford must have been considerable; but the high standing which he enjoyed has been attributed as much to the zeal with which he opposed Popery and Arminianism, as to his superior ability or learning. There had already commenced between him and Laud, that violent opposition of theological

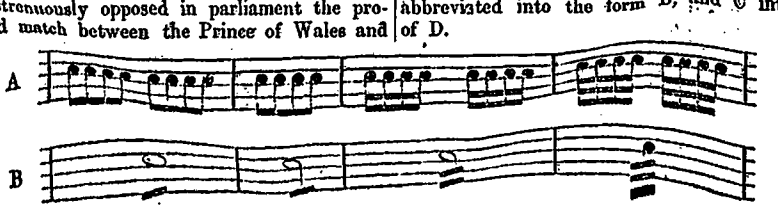
sentiment, which, involving them eventually in political hostility and in a contest of personal ambition, made them rivals and enemies for life. In 1599, Abbot was promoted to the deanery of Winchester, and in 1604 was one of the persons charged with the new translation of the Bible. He was one of eight to whom the whole of the New Testament, with the exception of the Epistles, was entrusted. In 1608 he was appointed chaplain in the establishment of the Earl of Dunbar, at that time James the First's chief favourite. Soon afterwards, the earl was despatched to Scotland by the king, in order to commence that attempt to bring about a uniformity between the two national churches, the prosecution of which so greatly contributed to the disastrous fate of the line of Stuart. Abbot accompanied the earl on this mission, and gave himself to its object with so much zeal as to secure the highest approbation and favour both from the earl and the king. His promotion in the church now proceeded with great rapidity. He had in 1609 obtained the deanery of Gloucester, and in December of the same year he was made Bishop of Lichfield and Coventry. In February, 1610, he was transferred to the see of London; and, finally, in little more than a month afterwards, elevated to the archbishopric of Canterbury

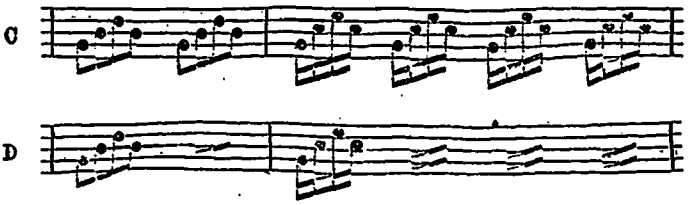
The bright fortunes of Abbot were, however, clouded by an occurrence of which his enemies took signal advantage. On the 24th of July, 1622, the archbishop was occupied in a stag hunt in Lord Zouch's park, at Harringworth, in Hampshire, where, while he sat on horseback, he discharged a barbed arrow from his cross-bow, which unfortunately struck one of the park-keepers in the fleshy part of the arm, and occasioned his death in less than an hour. The party in the church and state to whom Abbot was opposed employed every effort to turn this accident to his disadvantage; and the king was obliged to yield so far to the clamour that was raised, as to appoint a commission to consider the case of the archbishop, and to determine whether he had not by this act of chance-medley incapacitated himself, as Laud and his partizans asserted, for discharging the duties of his office. The adjudication of the commissioners was, that nothing more than an irregularity had been committed, but that it would be necessary for the archbishop to receive the king's pardon, and also a dispensation, before he could resume the exercise of his functions. These forms were accordingly gone through, and thus the affair terminated. He settled a pension of twenty pounds a-year for life on the man's widow. After this he withdrew for some time from his attendance at the Council Board, and took no part in public affairs. He strenuously opposed in parliament the projected match between the Prince of Wales and the Infanta of Spain. On the 2nd of February, 1626, Abbot crowned Charles I., in Westminster Abbey, Laud officiating as Dean of Westminster. The new reign confirmed the ascendancy of Laud and Buckingham, and left the archbishop and his politics less influence at court than ever. In these circumstances he selected and steadily persevered in that independent path in which alone he was now to find either honour or safety. In 1627, when Dr. Manwaring was brought to the bar of the House of Lords, and sentenced to be fined, admonished, suspended, and imprisoned, for a sermon in which he asserted that 'the king is not bound to observe the laws of the realm concerning the subjects' rights and liberties, but that his royal will and command in imposing loans and taxes without common consent in parliament, doth oblige the subjects' conscience upon pain of eternal damnation;' Abbot, in reprimanding the culprit, by order of the House, expressed in energetic terms his abhorrence of so audacious a doctrine. He also refused to license another discourse of a similar description, which had been preached at Northampton, by Dr. Sibthorp, and for this he was suspended from his archiepiscopal functions, and ordered into confinement in one of his country houses. It was soon afterwards, however, found necessary to release him, and he received his summons as usual to the parliament which assembled in March, 1628. During the rest of his life he continued to oppose the arbitrary and oppressive measures of the court and despotic counsels of Laud. He died at his palace at Croydon, August 4, 1633, and was buried in the church of his native town of Guilford, where a sumptuous monument is erected to his memory. He was the founder of a well-endowed hospital, which still exists in that town.

Archbishop Abbot is the author of several literary productions, among which is 'A Brief Description of the whole World,' published in 1636. His brother, Robert Abbot, was raised to the see of Salisbury, in 1615, but died on the 2nd of March, 1618. His youngest brother, Maurice Abbot, was an eminent London merchant, and was, in the course of his life, one of the first directors of the East India Company, Lord Mayor, and representative of the city in parliament. He died in 1640. The sons of the poor clothworker were thus singularly fortunate in their worldly advancement.

(*Biographia Britannica;* Wood's *Athenæ Oxonienses,* by Bliss; Fuller's *English Worthies;* Rushworth's *Collections;* Southey's *Book of the Church.*)

ABBREVIATION, in Music, is a kind of short-hand, which much diminishes the labour of the composer and copyist. There are many varieties: for instance, the passage A may be abbreviated into the form B, and C into that of D.





The words *simili* (the same), and *bis* (twice), denote repetition. The abbreviations of Italian or other terms used in music, are given under the respective words.

ABBREVIATIONS. Of the abbreviations in general use in England, some are so common as not to be worth mention, such as Mr., Esq., N.E.W.S., &c. Of those which are less generally known, and may present a difficulty, the following are some of the most important :—

A.B., B.A., Artium Baccalaureus, Bachelor of Arts.
A.M., M.A., Artium Magister, Master of Arts.
A.C., Ante Christum, Before Christ.
A.D., Anno Domini, In the Year of the Lord.
A.M., Anno Mundi, In the Year of the World.
A.M., Ante Meridiem, Before Noon.
A.H., Anno Hegiræ, In the Year of the Hegira.
A.U.C., Anno Urbis Conditæ, In the Year of the Building of the City (of Rome).
Abp., Archbishop.
B.C.L., Bachelor of Civil Law.
B.D., Baccalaureus Divinitatis, Bachelor of Divinity.
B.L., Baccalaureus Legum, Bachelor of Laws.
B.M., Baccalaureus Medicinæ, Bachelor of Medicine.
B.C., Before Christ.
Bp., Bishop.
Bt., Bart., Baronet.
C., Cap., Caput, Chapter.
C., Cent., Centum, a Hundred.
C.P.S., Custos Privati Sigilli, Keeper of the Privy Seal.
C.S., Custos Sigilli, Keeper of the Seal.
D., Denarius, Denarii, Penny, Pence.
Dr., Doctor, Debtor.
D.C.L., Doctor of Civil Law.
D.D., Divinitatis Doctor, Doctor of Divinity.
D.G., Dei Gratia, By the grace of God.
Dwt., Pennyweight.
e. g. Exempli gratia, for example.
Ep., Epistle.
Ex., Example.
F.G.S., Fellow of the Geological Society.
F.L.S., Fellow of Linnæan Society.
F.R.S., Fellow of the Royal Society.
F.A.S., Fellow of the Antiquarian Society.
F.D., Fidei Defensor, Defender of the Faith.
G.C.B., Grand Cross of the Bath.
H.M.S., His or Her Majesty's Ship.
i. e., id est, that is (that is to say).
ib., or ibid., ibidem, in the same place.
id., idem, the same.
J.H.S., Jesus Hominum Salvator, Jesus the Saviour of Men.
Inst., Instant, this month.
K.B., Knight of the Bath.
K.C.B., Knight Commander of the Bath.
K.G., Knight of the Garter.
K.P., Knight of St. Patrick.
K.T., Knight of the Thistle.
Kt., Knight.
L. or Lib., liber, book ; lb., libra, pound.
Lp., Lordship.
LL.D., Legum Doctor, Doctor of Laws.
M., mille, a thousand.
M.D., Medicinæ Doctor, Doctor of Medicine.
M.P., Member of Parliament.
MS., Manuscriptum, a manuscript.
MSS., Manuscripta, manuscripts.
N.B., Nota Bene, observe well.
N.S., New Style (after the Year 1752).
Nem. Con., Nemine contradicente, No one contradicting.
Nem. Dis., No one dissenting, unanimous.
O.S., Old Style (Before the Year 1752).
P.M., Post Meridiem, afternoon.
P.S., Postscriptum, written afterwards, postscript.
Qu., ?, quere, query.
R., Rex, King.
R.A., Royal Academician.
R.N., Royal Navy.
Rt., Right; Rt. Hon. ; Right Honourable.
S.T.P., Sanctæ Theologiæ Professor, Doctor of Divinity.
Ult., ultimo, last month.
Viz., videlicet, namely, that is to say.
W.S., Writer to the Signet (Scotland).
Xt., Xmas., Christ, Christmas.

ABD-EL-RAHMAN. [Moors.]

ABDALLATTIF, an Arabian physician and writer, was born at Bagdad A. D. 1162 (A. H. 557). He was instructed by the most eminent teachers of Bagdad, and directed his studies especially to philology, medicine, and alchemy. He obtained professorships and delivered lectures at Mosul, at Damascus, and at Cairo. The professorship at Damascus was given him by the Sultan Saladin, when the three years' truce was made between Saladin and the Crusaders at Jerusalem, in 1192. At Cairo he became acquainted with Maimonides, and during his residence there wrote, in 1203, a 'Compendium of the History of Egypt,' which has been translated into French by De Sacy, under the title of 'Relation de l'Egypte,' &c., Paris, 1810, 4to. Abdallattif delivered lectures also in Aleppo, and travelled in Asia Minor. He died at Bagdad in the year 1231, when on his way to Mecca, in the performance of a pilgrimage.

The titles of 166 works written by Abdallattif

have been recorded, about one-fourth of which were on medical subjects. Of all these writings only one has been translated and published in Europe, the 'Compendium of the History of Egypt.' Only a single MS. of this work is known to exist in Europe, which was brought by Pococke from the East, and is now in the Bodleian Library at Oxford. The work is divided into two parts, of which the first treats of —The General Character of Egypt—of Plants—of Animals—of the Ancient Monuments—of Buildings and Ships—of the Food of the Egyptians; and the second treats of—The Overflowing of the Nile, and of the years 1200 and 1201, which were seasons of dreadful famines. A German translation of this work, by Professor Wahl, was published at Halle, in 1790, 8vo. It is not of much value. De Sacy's translation is very valuable, not only for his own critical and explanatory notes, but on account of the assistance which he received from the most eminent zoologists and botanists of Paris. It is a work well worth consulting for the geography, natural history, and antiquities of Egypt.

ABDICATION (from the Latin *abdicatio*), is the voluntary renouncing and giving up an office by the party who holds it. The term is now generally applied to the giving up of the kingly office; and in some countries a king can abdicate, in the proper sense of the term. But the king of England cannot abdicate, except with the consent of the two Houses of Parliament, in any constitutional form; for a proper abdication would be a divesting himself of his regal powers by his own will, which is inconsistent with the nature of his kingly office. It is, however, established by a precedent, that he abdicates, or an abdication may be presumed, if he does acts which are *inconsistent* with that system of government of which he forms a part. In Blackstone's 'Commentaries,' vol. i. pp. 210–212, and iv. p. 78, mention is made of the resolution of both Houses, in 1688, that 'King James II. having endeavoured to subvert the constitution of the kingdom by breaking the original contract between king and people; and by the advice of Jesuits and other wicked persons having violated the fundamental laws, and having withdrawn himself out of the kingdom, has abdicated the government, and that the throne is thereby vacant.' Thus, it appears, that the Houses of Lords and Commons assumed the doctrine of an original contract between the king and the people as the foundation of their declaration that James II. had abdicated the throne; and Blackstone, in arguing upon this declaration, assumes, what is contrary to the evidence of history, that the powers of the King of England were originally delegated to him by the nation.

In the conference between the two Houses of Parliament, previous to the passing of the statute which settled the crown upon William III., it was disputed whether the word 'abdicated,' or 'deserted,' should be the term used to denote in the 'Journals' the conduct of James II. in quitting the country. It was then resolved that the word 'abdicate' should be used, as including maladministration. But by making this resolution the Houses gave a new meaning to the word.

Among the Romans, the term 'abdicatio' signified generally a rejection or giving up a thing; and a magistrate was said to abdicate who for any reason gave up his office before the term was expired.

ABDOMEN, the belly, from *abdo*, to hide, because it conceals or hides its contents.

The human body is divided by anatomists into three portions, the head, the trunk, and the extremities. The head and trunk enclose cavities which contain the organs by which the most important functions of the living body are performed. The trunk forms two cavities, the superior of which is termed the thorax or chest, and the lower constitutes the abdomen.

In the artificial skeleton nothing is shown, because nothing remains except the mere framework of the body or the bones; but in the natural state, when the soft parts remain as well as the bones, there is a complete partition between the cavity of the chest and that of the abdomen. This partition is effected by means of an organ which is termed the diaphragm, a name derived from a Greek word signifying to divide. The diaphragm is composed partly of membrane, but chiefly of muscle. It is placed transversely across the trunk at about its middle portion, dividing it into two pretty nearly equal halves. [RESPIRATION.]

The cavity of the abdomen is bounded above by the diaphragm, below by the bones of the pelvis, or basin, which may be considered as belonging to the bones of the lower extremities, before and at the sides by the abdominal muscles, behind partly by the muscles of the loins and partly by the bone of the spine.

The cavity of the abdomen is lined throughout by a thin, but dense, firm, and strong membrane, termed the peritoneum.

We have spoken of the abdomen as a cavity, but without explanation this mode of expression may occasion misconception. During the state of life there is no cavity. The abdomen is always completely full. The diaphragm alternately enlarges and diminishes the space proper to the abdomen; but the abdominal and lumbar muscles which form so large a part of the boundaries of the abdomen in front, at the sides, and behind, in like manner alternately contract and relax. The consequence is, that a firm and uniform pressure is at all times maintained upon the whole contents of the abdomen, so that there is always the most exact adaptation of the containing to the contained parts, and of the viscera one to the other, not the slightest space or cavity ever intervening either between the walls of the abdomen and its viscera, or between one viscus and another. By the cavity of the abdomen, therefore, is not meant what the expression might at first view seem to denote, namely, a void or empty space; but the term is merely employed to mark the extent of the boundary within which the abdominal viscera are inclosed.

When the number, the diversity, the proximity, the relation, and the importance of the organs con-

tained within the abdomen is considered, it will be obvious that it must be a matter of absolute necessity to the anatomist, the physiologist, the physician, and the surgeon, to mark with accuracy the situation of each. An effectual expedient for the accomplishment of this object is now in universal use. It consists in dividing the whole extent of the abdomen into certain parts or regions. It must be borne in mind that this division is altogether arbitrary, and is adopted not because there is any such division in nature, but solely because it is convenient for the purposes of science.

ABDO'MEN, in Insects, has a somewhat different signification from the same term when applied to other animals, being used for the whole portion of the body of an insect behind the corselet (*thorax*), and including the back as well as the belly. It consists, in most cases, of a number of rings without any jointed members for locomotion, and uniformly incloses a portion of the intestines, though sometimes but a very small one. These rings, or very short hollow cylinders, are severally united with each other by a joint, by a membrane, or sometimes by an intimate junction, the exact line of which is not very apparent. The rings in some cases, as in the grub of the chameleon fly, slide into one another like the tubes of an opera-glass. Each ring is technically termed a segment (*segmentum*), virtually composed of two principal pieces, which, when distinct, are termed arches; the upper the arch of the back, the under the arch of the belly. In some cases these two portions are not distinct, but, when they are so, the two borders usually come into contact. When they do not, but remain free, one usually, more or less, overlaps the other, as in bees. In caterpillars, grubs, and wingless insects, such as the flea, where the joining of the corselet with the abdomen is not apparent, the abdomen may always be known by the legs never being jointed with it; and in caterpillars it usually consists of all the body behind the six fore legs, which are always on the corselet.

ABDOMINA'LES, in Zoology, the name of a group of fishes, to which different naturalists have attached a more or less extensive signification, according to the particular principles of their several systems. The system of ichthyology (the knowledge of fishes) of Linnæus is founded upon the presence and position of the ventral fins (those of the belly) in relation to the pectoral (those of the breast); and these he justly enough regards as analogous to the fore and hind members of quadrupeds, and to the wings and feet of birds. Linnæus includes, in his order Abdominales, all those species which have the ventral fins placed behind the pectoral, or upon the abdomen, the cartilaginous fishes alone excepted; which, after the example of Ray, Willughby, and Artedi, he very properly considers as forming an order apart. But this arrangement, though at first sight plausible, and apparently founded upon the modifications of important organs, is, in reality, extremely defective, and fails altogether in displaying the different genera and species of this class of animals, according to their natural affinities.

M. Cuvier, perceiving the deficiency of the Linnæan system in this respect, revived the more correct and natural arrangement of Artedi; and after, first of all, dividing the class of fishes into the three great orders — Chondropterygii, Acanthopterygii, and Malacopterygii, according to the cartilaginous or osseous nature of their skeletons and fins, afterwards applies the principles of Linnæus, or the relative position of the pectoral and ventral fins, to subdivide the last of these orders into families. In its present acceptation, therefore, the term abdominales denotes a family, or subdivision of malacopterygious (or soft-finned) fishes only; and, in this restricted sense, includes the greater number of the fresh-water species, as well as those which, like the salmon, periodically migrate from the ocean to deposit their spawn in fresh-water lakes and rivers. M. Cuvier subdivides this family into five subordinate groups, all of which he has defined by appropriate and unequivocal characters. He denominates these subfamilies cyprinoïdes, siluroïdes, salmonoïdes, clupeoïdes, and lucioïdes respectively, from the carps, silures, salmons, herrings, and pikes, the typical genera from which their characters are severally taken.

ABDUCTION (from the Latin word *abductio*, which is from the verb *abducere*, to lead or carry off) is an unlawful taking away of the person of another, whether of child, wife, ward, heiress, or women generally.

By 9 George IV. c. 31, s. 19, when any woman shall have any interest, legal or equitable, present or future, in any estate real or personal, or shall be heiress presumptive, or next of kin to any one having such interest, any person who from motives of lucre shall take or detain her against her will for the purpose of her being married or defiled, and all counsellors, aiders, and abettors of such offences are declared guilty of felony, and punishable by transportation for life or not less than seven years, or imprisonment, not exceeding four years, with or without hard labour. The taking of any unmarried girl under sixteen out of the possession of a parent or guardian, is declared a misdemeanor, and is punishable by fine and imprisonment (s. 20).

The forcible abduction and marriage of women is a felony. Here, and in the case of stealing an heiress, the usual rule, that a wife shall not give evidence for or against her husband, is departed from; for in such case the woman can with no propriety be reckoned a wife, where a main ingredient, her consent, was wanting to the contract of marriage; besides which there is another rule of law, that 'a man shall not take advantage of his own wrong,' which would obviously be done here, if he who carries off a woman could, by forcibly marrying her, prevent her from being evidence against him, when she was perhaps the only witness to the fact.

ABEL, the second son of Adam. His biography is contained in the fourth chapter of 'Genesis.'

ABEL, CARL FRIEDRICH, was a native of Germany, and a pupil of Sebastian Bach. He served for some years in a military band at Dresden; but he quitted that service in 1758, and reached

England, where he was appointed chamber-musician to the queen, at a salary of 200*l.* per annum; and shortly after he united with J. Christian Bach in forming a weekly subscription concert, which for many years continued to be highly patronised and liberally supported. His chief instrument was the *viol da gamba*, a small violoncello with six strings, now fallen into disuse. With this he produced an effect on his auditors which scarcely any one since has been able to achieve on bowed instruments. Dr. Burney spoke highly of Abel's adagio compositions and performances; but similar works by later masters, such as Haydn, Mozart, Beethoven, Clementi, Dussek, and Cramer, are in the present day much more highly esteemed. Abel was intemperate in the use of fermented liquors, and brought his life to a hasty close in the year 1787.

ABEL, NIELS-HENRI, was born Aug. 5, 1802, in the province of Christiansand in Norway, where his father was a clergyman. He commenced his studies at the cathedral school of Christiania, and at the age of sixteen showed a decided turn for mathematics. In 1821 he entered the university, and soon afterwards published his first essay. In 1825 the government gave him an allowance to enable him to travel. He went accordingly through France, Germany, and Austria, and formed an acquaintance with M. Crelle, in whose journal most of his works are published. He returned in 1827, and died of consumption April 6, 1829. Abel's mathematical writings are among the most remarkable of the present century; particularly those on elliptic functions, and on the impossibility of the solution of the equation of the fifth degree.

Abel's collected works, including those which he left in manuscript, were published in French, by the Norwegian government, in 2 vols. 4to, 1839.

(*Biographical Dictionary*, published by the Society for the Diffusion of Useful Knowledge.)

ABELARD, or ABAILARD, PIERRE, was born in 1079, at Palais, in Britanny. His father was a man of some rank and property, and spared no expense in the education of Abelard. He left Palais before he was twenty years of age, and went to Paris, where he became a pupil of Guillaume de Champeaux, a teacher of logic and philosophy of the highest reputation in those times. At first the favourite disciple, by degrees Abelard became the rival, and finally the antagonist of Champeaux. To escape the persecution of his former master, Abelard, at the age of twenty-two, removed to Melun, and established himself there as a teacher, with great success. Thence he removed to Corbeil, where his labours seem to have injured his health; and he sought repose and restoration by retirement to his native place, Palais, where he remained a few years, and then returned to Paris: the controversy between the two antagonists was then renewed, and the contests continued till Champeaux's scholars deserted him; and he retired to a monastery. Abelard having paid a visit to his mother at Palais, found on his return to Paris in 1113, that Champeaux had been made bishop of Châlons-sur-Marne.

The dialectic conflicts having now ceased, Abelard commenced the study of divinity, under Anselm, at Laon. Here also the pupil became the rival of his master, and Anselm at length had him expelled from Laon, when he returned to Paris, and established a school of divinity, which was still more numerously attended than his former schools had been. Guizot says, 'In this celebrated school were trained one pope (Celestine II.), nineteen cardinals, more than fifty bishops and archbishops, French, English, and German; and a much larger number of those men with whom popes, bishops, and cardinals, had often to contend, such as Arnold of Brescia, and many others. The number of pupils who used at that time to assemble round Abelard has been estimated at upwards of 5000.'

Abelard was about thirty-five or thirty-six years of age, when he formed an acquaintance with Heloise, the niece of Fulbert, a canon in the cathedral of Paris. She was probably under twenty years of age. Abelard fell in love with Heloise, and got himself introduced into the house of Fulbert as the tutor of his niece. The result was a criminal intercourse between the two lovers, which was at length discovered by Fulbert, and Heloise was removed by Abelard to the residence of his sister in Britanny, where she gave birth to a boy.

Fulbert insisted that the wounded honour of his niece should be repaired by a marriage, to which Abelard assented willingly; but Heloise with more reluctance, probably from a fear that his prospects would be ruined, the highest dignities of the church in those days being exclusively bestowed on unmarried ecclesiastics. The marriage took place at Paris, and it was agreed to be kept secret; but Fulbert took pains to make it public, while Heloise, who resided with him, denied it; the consequence of which was that her uncle treated her with great harshness, and Abelard took her away and placed her in the convent of Argenteuil, near Paris. Fulbert, who seems to have thought that he intended to make her a nun in order to get rid of the incumbrance of a wife, vowed a cruel revenge, which he soon found means to execute. The valet having been bribed, admitted Fulbert and his party into Abelard's bed-room by night, when they performed a cruel mutilation of his person. The perpetrators fled, but the valet and another were taken, and were punished by putting out their eyes and the infliction of a similar mutilation. The canon Fulbert was banished from Paris, and all his property was confiscated. Abelard recovered from the wound; but as the canon law rendered him incapable of holding any ecclesiastical preferment, he entered the abbey of St. Denis as a monk, and Heloise became a nun in the convent of Argenteuil.

The abbot and monks of St. Denis were dissolute, and Abelard reproved them in a course of lectures which he delivered in a cell detached from the abbey: the monks got up a charge of heresy against a work which he wrote on the Trinity

and by a council held in 1121 at Soissons, in which he was not permitted to defend himself, the book was condemned and ordered to be burnt. Abelard had also denied that the abbey of St. Denis was founded by Dionysius of Athens, the Areopagite, as the monks asserted. This enraged the monks and abbots still more, and by a series of persecutions and threats Abelard was compelled to fly from St. Denis and place himself under the protection of the Count of Champagne. In a solitary spot of the territory of Troyes he erected a small oratory of wickerwork and thatch, and commenced giving lectures, to which numerous scholars crowded from far and near; the wickerwork was then changed into a building of stone and timber, and Abelard named it Paraclete, or 'the Comforter.' But persecution still attending him, he left the Paraclete to become superior of the monks in the abbey of St. Gildas of Ruys, near Vannes, in Britanny.

Heloise too was not without her share of troubles. The convent of Argenteuil, of which she had been made prioress, was claimed by an abbot as belonging to his abbey, and Heloise and her nuns were ordered to leave it. Abelard gave them the oratory of the Paraclete, and there they were established, Abelard himself, after eleven years of separation from Heloise, officiating in the ceremony of consecration.

Bernard, abbot of Clairvaux, whose monastery was not far from the Paraclete, having objected to some of the forms of prayer used by Heloise and her nuns, Abelard defended them; and this led to a controversy with the abbot, who eventually accused Abelard of heresy. Abelard appealed to a council, which was held in the year 1140, in the cathedral of Sens, in Champagne, where he defended himself. But the influence of Bernard was more powerful than the logic of Abelard; he was condemned by the assembly; but he appealed to the Pope, and set out on his journey to Rome, which, however, he never reached, having been induced by Peter the Venerable to remain in his monastery at Cluni, near Maçon. The Pope confirmed the sentence of the council of Sens, and Abelard was ordered to be confined, all his works to be burned, and he himself was prohibited from writing anything more. Peter the Venerable addressed a remonstrance to the Pope, Innocent II., and the sentence was suspended. During this suspension Abelard was removed to the priory of St. Marcel, near Châlons, for change of air, and there he died April 21, 1142, in the 63rd year of his age. He was at first interred by the monks of Cluni in their monastery, but his remains were afterwards removed to the Paraclete.

Heloise lived twenty years afterwards, as prioress of the Paraclete, and when she died was buried, at her own request, in Abelard's tomb. The remains of Abelard and Heloise remained undisturbed for upwards of 300 years, till in 1497, they were removed to the church of the abbey, and were afterwards shifted to other places. In 1800 they were removed to the garden of the Musée Français at Paris, and in 1817 were placed in the cemetery of Père la Chaise, where they still remain beneath their gothic tomb.

Abelard was a proficient in the scholastic learning of the times, a dexterous dialectician, and a subtle thinker. His theological works gave an impulse to the age, and though his writings are of little value now, they belong to the history of philosophy and the progress of the human mind. The disputes of that age turn largely on verbal trifles, but these disputes form part of the effort of philosophy to emancipate itself from the fetters of religious intolerance. [NOMINALISTS.] Though Abelard possessed the learning of the times, it is probable that he knew little of Greek or Hebrew, and yet Heloise, according to his testimony, knew Latin, Greek, and Hebrew. The personal character of Abelard is best shown by his letters and those of Heloise. When he had once transgressed the bounds of his duty by his illicit commerce with Heloise, he lost all self-control, and appears a sensualist. When his misfortunes drove him from the world, he became cold and unfeeling towards the noble minded woman, whose passion and ardent attachment show that she was capable of the most unbounded devotion to him whom she loved. The most complete edition of their works is 'Petri Abelardi et Heloisæ Conjujis ejus Opera, nunc primum edita ex MSS. Codd. Francisci Amboesi,' Paris, 1616, 4to. M. Victor Cousin has also published 'Ouvrages Médits d'Abailard, Paris, 1836. There are several other editions, some of which have portions, such as the 'Letters,' translated.

(*Biographical Dictionary* published by the Useful Knowledge Society; *Biographie Universelle;* Bayle's *Dictionary.*)

ABELE TREE. [SALICACEÆ.]

ABELMOSCHUS. [HIBISCUS.]

ABEN ESRA, or with his complete name, *Abraham ben Meïr ben Esra,* a celebrated Jewish scholar, was born at Toledo, probably in A. D. 1119, and died about 1194, at an age of seventy-five years. A considerable portion of his life was spent in travelling. He visited Mantua in 1145, and the island of Rhodes in 1156; in 1159 he was in England, and in 1167 at Rome. His celebrity among his contemporaries, as a scholar and as an accomplished writer of the Hebrew language, was very great. Among ourselves Aben Esra has become known chiefly through his great commentary on the Old *Testament,* which, it seems, he wrote at different periods, between the years 1140 and 1167. It has been printed in the great Rabbinical editions of the Bible, which have appeared at Venice, Bâle, and Amsterdam; and there have been besides many separate editions of single parts of it. Aben Esra wrote also on mathematics, astronomy, philosophy, medicine, philology, and astrology. His treatise in verse on the game of chess, translated by Thomas Hyde (Oxford, 1667, 1694), affords us a specimen of his skill in poetic composition. For an enumeration of the works of Aben Esra, which are still preserved in MS. in several of the libraries of Europe, see the article 'Aben Esra,' by Hartmann, in Ersch and Gruber's *Encyclopœdia.*

ABENCERRAGES (*Beni Serraj*), is the name given by Spanish chroniclers and romance writers

to a noble family in the Arabic kingdom of Granada, several members of which distinguished themselves during the period immediately preceding the fall of the Mohammedan empire in Spain. [Moors.]

ABER, a Celtic term which forms the prefix of several names of places in Great Britain. It means generally the mouth or embouchure of a river, whether it falls into the sea or into another river; and sometimes it means a port or harbour. Most of the places so named are in Wales, as Abergavenny, at the confluence of the Usk and Gavenny, and Aberystwith, at the outlet of the Ystwith; and a few in Scotland, as Aberbrothock (Arbroath), at the mouth of the Brothock, in Forfarshire; Aberdour, at the mouth of the Dour, in Aberdeenshire.

ABERBROTHOCK, ABERBROTHWICK, or most commonly ARBROATH, a sea-port and town in Forfarshire, Scotland, at the mouth of the small river Brothock, 56° 35′ N. lat., 2° 30′ W. long. The town or ancient royal burgh of Arbroath is on the east side of the river, in the parish of Arbroath; but the suburbs extend on the west side of the river into the adjoining parish of St. Vigean's. In 1831 the town contained, in Arbroath parish, 6624 inhabitants; in St. Vigean's parish, 4587; in all, 11,211. In 1841 the town contained, in Arbroath parish, 7218 inhabitants; in St. Vigean's parish, 5195; in all, 12,413. The erection of Arbroath into a royal burgh is very ancient, but the date is not known; the most ancient charter extant was granted by James VI. in 1599. Previous to the Reform Bill it sent one member to Parliament, in conjunction with Aberdeen, Montrose, Bervie, and Brechin. It is now included in the Montrose District, which consists of Montrose, Arbroath, Forfar, Bervie, and Brechin. The population of the parliamentary borough in 1841 was 14,568, of whom 6764 were males, and 7804 females. There was formerly an abbey at Arbroath, founded by King William the Lion in 1178, and dedicated to Thomas à Becket, archbishop of Canterbury. The abbey was destroyed at the Reformation, in 1560, but considerable portions of the ruins yet remain. Of the modern buildings, the parish church, with a very elegant gothic spire, and the chapel of ease, are the most conspicuous. There are several dissenting meeting-houses. The town-house and the academy are handsome buildings, and there is also a guild-hall and a trades-hall. The prison is in the upper part of the town-house. There is a signal-tower for communicating with the Bell-Rock Lighthouse. [Bell-Rock.] Most of the houses are built of a red sandstone from quarries in the neighbourhood. Part of the high-street looks well, but most of the other streets are narrow. The principal manufactures of the town are, yarn spun from flax and hemp, canvas, brown and bleached linen, leather, cast-iron, and bone-dust. In the town and suburbs there are altogether sixteen spinning-mills, which are driven by the river. The harbour is small, and dry at low-water; at spring-tides there is about 15 feet of water at the entrance, and 9 or 10 feet at neap-tides. There is a bar of rock at a short distance from the mouth of the harbour, which prevents vessels of large burthen from entering it. The harbour consists of a basin faced with stone, about 124 yards long by 80 wide, and defended by an outer stone bulwark and by beams of timber. About 80 vessels belong to the port. There are railways from Arbroath to Forfar, and from Arbroath to Dundee. (*New Statistical Account of Scotland.*)

ABERCROMBIE, JOHN, M.D., was born on the 11th of November, 1781. He was the son of the Rev. Mr. Abercrombie, for many years one of the town-ministers of Aberdeen. He studied medicine in the Scottish metropolis, and took his degree there on the 4th of June, 1803. He became a Fellow of the Royal College of Surgeons in the year 1805. He became a licentiate of the Royal College of Physicians in 1823, and in 1824 was admitted a fellow of the body. In 1834 the University of Oxford marked their estimation of his character and talents by conferring on him the honorary degree of Doctor of Medicine. In the year 1835 Dr. Abercrombie was elected Lord Rector of the Marischal College of Aberdeen. He died suddenly, on Thursday, Nov. 14, 1844, at his house in York Place, Edinburgh.

The writings of Dr. Abercrombie contributed no less to the establishment and maintenance of his fame, than his singularly useful career as a practical member of his profession. In the early part of his course he confined his literary labours to the 'Edinburgh Medical and Surgical Journal,' and other periodicals in his own department of science. His first distinct work was one entitled 'Pathological and Practical Researches on Diseases of the Brain and the Spinal Cord,' Edinburgh, 1828, 8vo. In 1828 he published 'Pathological and Practical Researches on the Diseases of the Intestinal Canal, Liver, and other Viscera of the Abdomen,' Edinburgh, 8vo. In 1830 appeared his 'Inquiries concerning the Intellectual Powers and the Investigation of Truth,' Edinburgh, 8vo.; and, in 1833, 'The Philosophy of the Moral Feelings,' London, 8vo. The latter is in some measure a sequel to the first, and the whole composes a view of human nature intellectually and morally, in which the facts of science and the revelations of religion are combined together in peculiar harmony. The best of these two works in every respect, is that on the Intellectual Powers. For range of acquirements, solid as well as extensive, Dr. Abercrombie stood unequalled among the Scottish physicians of his day. He earned by his writings a name that will not be forgotten, and he will long be remembered, as a private individual, for his singular piety and benevolence.

ABERCROMBY, SIR RALPH, was the son of George Abercromby, Esq., of Tullibody, in Clackmannanshire. Ralph Abercromby was born in Oct. 1734, at Menstry, in Clackmannanshire. After receiving a liberal education, he entered the army in March, 1756, as a cornet in the 3rd regiment of dragoon guards. By the year 1787 he had reached the rank of major-general. When the war with France broke out in 1793, Aber-

cromby was sent to Holland, with the local rank of lieutenant-general, in the expedition commanded by the Duke of York. His bravery during the prosperous commencement of this campaign was not more conspicuous than the skill, energy, and humanity, with which he conducted the disastrous retreat. He returned to England in April, 1795, and in August of the same year he was sent out to the West Indies, as commander-in-chief of the forces there. In 1796 he took in succession Grenada, Demerara, Essequibo, St. Lucia; and St. Vincent and Trinidad in Feb. 1797. On his return to England he found that he had been made a Knight of the Bath, and raised to the rank of lieutenant-general; and soon afterwards he received the command of the 2nd or North British dragoons (the Scotch Greys), and the appointment of lieutenant-governor of the Isle of Wight. In the following year, on the breaking out of the rebellion in Ireland, Sir Ralph proceeded thither as commander-in-chief; but after he had held that office for a short time, he was transferred to the chief military command of Scotland, and the governorship of Fort Augustus and Fort George. He was soon, however, called again to active service abroad, when the second expedition was sent against the French in Holland, in August, 1799, with the conduct of which he was entrusted, before the arrival of the Duke of York. It proved, as is well known, equally unfortunate with the former; but it did not the less afford many opportunities to General Abercromby of displaying his activity, intrepidity, and high military talent.

In 1801 Sir Ralph Abercromby was employed to command the English forces despatched against the French in Egypt. On the 8th of March, 1801, he effected the landing of his troops at Aboukir. A few days afterwards the French made a general attack upon the English forces as they lay encamped near Alexandria, but were speedily repulsed. On the 21st was fought, on the same ground, the more obstinate and bloody engagement usually designated the battle of Alexandria, in which the French were again driven back at all points. But the victory was purchased at the cost of the life of Sir Ralph Abercromby, who was unhorsed and severely wounded in the thigh, at an early period of the action, by one of the enemy, whom however he disarmed. Remounting his horse, 'he concealed his situation,' says the despatch of Lord Hutchinson, 'from those about him, and continued in the field giving his orders with that coolness and perspicuity which had ever marked his character, till long after the action was over, when he fainted through weakness and loss of blood.' He was immediately conveyed to the ship of the admiral, Lord Keith. He died March 28, 1801, in his 68th year. His body was interred in the burial-ground of the commandery of the grand master, under the walls of the castle of St. Elmo, near the town of La Valetta, in Malta. A monument has been erected to his memory, by order of the House of Commons, in St. Paul's Cathedral. Sir Ralph Abercromby, whose private character was as excellent as his public merits were great, left four sons and two daughters, of whom the present Lord Abercromby is the eldest. On his death, his widow was created Baroness Abercromby, of Aboukir and Tullibody.

ABERDEEN (*New Aberdeen*), a city, parliamentary borough, and sea-port, the capital of Aberdeenshire, is situated on the north side of the river Dee, where it is discharged into the German Ocean, 57° 8′ N. lat., 2° 5′ W. long. The population of the city of Aberdeen, in 1841, was 61,923; the population of the parliamentary borough was 63,288. The population of the parliamentary borough, in 1831, was 58,018, which shows an increase of 5270 in the ten years. It sends one member to Parliament. The number of voters registered is generally about 2200.

Aberdeen is a handsome town, with wide streets and lofty houses constructed of granite from the neighbouring quarries. The principal public buildings are the Town-house and Prison, the Aberdeen Bank, the Masonic Lodge, the Assembly Rooms, the Marischal College, the parish church of St. Nicholas, five or six chapels of ease, and numerous places of worship for dissenters. The civil government of the town is under a provost, four baillies, a dean of guild, treasurer, and town-council. The city is paved, lighted with gas, and supplied with water, under a board of commissioners.

The prison at Aberdeen is the chief prison for the county: it is well built, well ventilated, and contains ample accommodation for the separate system, which, according to the Report of the Inspectors of Prisons, dated February 11, 1846, was then in full operation.

The harbour is spacious, and is rendered safe by a pier of granite on the north side of the Dee, which extends into the German Ocean. Two batteries command the entrance.

Aberdeen is a place of large trade, with many manufactures of cotton, linen, and woollen; extensive iron-works, ship-building yards, including large steam-vessels, and manufactures of most of the articles connected with ships and ship-building. The number of sailing vessels registered at Aberdeen, in 1844, was, under 50 tons, 59 vessels (1492 tons burthen), and 263 vessels of 50 tons and upwards (47,067 tons burthen); in all 322 vessels (48,559 tons burthen).

The commerce of Aberdeen is very large, as is shown by the following statement made to Parliament, for the year commencing January 1, 1845, and ending December 31, 1845:—

INWARDS.

	Vessels.	Tonnage.
Sail-vessels, coastwise	1676	153,258
Steam-vessels, coastwise	290	91,340
Sail-vessels, from the British colonies	56	12,600
Sail-vessels (British) from foreign ports	76	11,933
Sail-vessels (Foreign) from foreign ports	121	8,781
Total	2219	277,912

OUTWARDS.

	Vessels.	Tonnage.
Sail-vessels, coastwise	1006	85,908
Steam-vessels, coastwise	322	99,014
Sail-vessels, to the British colonies	32	8,905
Sail-vessels (British) to foreign ports	108	17,290
Sail-vessels (Foreign) to foreign ports	54	3,639
Total	1522	214,756

By a similar statement made to Parliament, for the year 1844, it is shown that the total number of vessels inwards was 1961 (226,210 tons), and the total number outwards was 1360 (179,967 tons).

The foreign commerce is chiefly with North America, the East Indies, West Indies, Mediterranean, and Baltic. Several ships were formerly employed in whale-fishing, but that trade has entirely ceased. The rivers Dee and Don supply a large quantity of salmon, which are exported to London and elsewhere.

The value of the Aberdeen granite shipped to London and other places has sometimes exceeded 40,000*l.* a year.

There are two bridges over the Dee, near Aberdeen, one of which is a suspension bridge, the other a stone bridge; and there is a canal, 18½ miles in length, from the harbour of Aberdeen to the Don at Inverury.

Marischal College, Aberdeen, takes its name from George Keith, fifth Earl Marischal, by whom it was founded in 1593. The number of students is about 220, besides about 100 divinity students, who attend, alternately, Marischal College and King's College, Old Aberdeen; and there are 106 bursaries, or endowments, for the support of students. The establishment consists of a chancellor, rector, dean of faculty, principal, secretary, thirteen professors, and nine lecturers, some of whom are professors.

Aberdeen is 425 miles N. by W. from London, and 108 miles N.N.E. from Edinburgh. There are railways in progress (January 1847) from Aberdeen to Montrose, Forfar, and Arbroath. Very large steam-vessels sail weekly between Aberdeen and London.

ABERDEEN, OLD, formerly and properly called *Aberdon* [ABER], is situated on the south bank of the Don, near the mouth, a short distance north from Aberdeen. It is sometimes called Old Machar, from the cathedral of St. Machar, part of which has been converted into the parish church of the parish of Old Machar, and the rest nearly demolished. Old Aberdeen contains about 2000 inhabitants. It is chiefly entitled to notice on account of King's College, which was founded by James IV., of Scotland, in 1494. The number of students is about 250. There are 134 bursaries. The establishment consists of a chancellor, rector, principal, sub-principal, and secretary, nine professors, and eleven lecturers, some of whom are professors. There are two bridges over the Don, which is navigable up to the New Bridge, on the road to Petersfield.

ABERDEENSHIRE is bounded on the N.E. and E. by the North Sea; on the other sides by Kincardineshire, Forfarshire, Perthshire, Inverness-shire, and Banffshire. Its greatest length is 88 or 89 miles; and its greatest breadth 38 miles. The area is estimated at 1970 square miles; it is in size the fifth of the Scottish counties. The population was in 1801, 123,082; in 1821, 155,387; in 1831, 177,657; and in 1841, 192,283.

Coast-Line.—The coast of Aberdeenshire has a tolerably regular outline, for the most part convex to the sea. From the mouth of the Dee it proceeds in a tolerably direct line for 12 miles north by east; but afterwards it bends more westward, and has several points and headlands. Buchan-ness and Inchkeith-point are the easternmost points of the mainland of Scotland. There is a lighthouse 118 feet high, built of granite, with what is termed 'a flashing light,' on Buchan-ness. The coast-line is much varied farther north: being skirted in some places by rocks rising 170 or 200 feet above the level of the sea. These rocks are penetrated by some remarkable fissures and caverns which formerly afforded great facilities for the concealment of smuggled goods. The rocks are chiefly of black basalt, gneiss, mica slate, or red granite. Beyond Rattray-head are some remarkable caves in the rocks, one of which served as a hiding-place to Lord Pitsligo, after the battle of Culloden, in 1746.

Surface and Geology.—The county is generally hilly; in the south-western part it is mountainous. The principal range of the Grampians forms, for a considerable distance, the southern boundary; and branches from this range traverse the county in other directions. Among the chief summits are Cairn Tagart or Taggart (about 3000 feet high), Loch na Gar (3815 feet), Mount Kean (3126 feet), Cairn Toul (4220 feet), Ben Macdhui, or Bennamuickduidh (4390 feet), ascertained by the Ordnance Survey to be 20 feet higher than Ben Nevis, hitherto regarded as the highest mountain in Great Britain. The mountain district of Braemar, in which or the neighbourhood most of these peaks are included, is chiefly granitic. The mountains frequently present tabular summits with steep precipitous sides; they vary in character, presenting sometimes mural precipices, sometimes slopes more or less steep: at the foot of the precipices or steeper slopes considerable masses of granitic débris are observable.

The neighbourhood of Aberdeen is occupied by granite, which is quarried in large quantities, and shipped at Aberdeen for London and other places. Granite is also found in various other parts of the county. It is frequently found disintegrated, at least in so friable a state as to be easily dug into by the pickaxe and spade; yet large blocks of fine building-stone are frequently quarried in the midst of a mass of disintegrated rock.

Syenite is found in various parts; and gneiss is met with in the districts adjacent to the granite, but not in great quantity. The predominant rock in the county is mica slate. In the parts adjacent to the granite it is quartzose and very compact, showing a tendency to pass into gneiss, or alter-

nating with that rock. Serpentine and primitive limestone are found in a few places; as are also clay slate, grauwacké, grauwacké slate, old red sandstone and magnesian limestone. Trap rocks and veins or dykes of trap also occur.

Rivers: Canals: Roads.—The principal rivers of the county are the Dee, the Don, the Ythan, the Ugie, and the Deveron or Doveran, with their respective tributaries. The Dee rises in the south-western part of the county, high up the side of the mountain Breriach, at an altitude of above 4000 feet; and in the first few miles of its course there are several falls, or as they are termed 'linns,' of which the principal, not from its height but its turbulence, is the Linn of Dee; the river here forces its way by four successive falls or rapids through a passage of rock, so narrow in some places that some persons have been hardy enough to step across it. The whole course of the river is about 90 miles. It receives, among other minor streams, the Muick, 12 miles long, on the right bank. In the upper part of the Muick are two small but picturesque lakes. Dhu-Loch, 'Black Lake,' is supposed to obtain its name from its being overshadowed by the lofty clifts of Craig Dhu-loch, which rise from its southern border to a height of more than 1000 feet. A mountain rill falls into it on the north side from a height of more than 200 feet. The other lake is called Loch Muick. The Dee descends 4000 feet in 80 miles, and is a rapid stream. Its inundations sweep away the good soil of the country through which it flows, and leave instead of it an unproductive sand. It is chiefly valuable for its salmon fishery, the yearly produce of which is estimated at 8000*l*. The mouth forms the harbour of Aberdeen.

The Don rises just on the western border of the county; its source is elevated about 1640 feet above the level of the sea, and its course is very winding. The river takes its rise in a peat moss: in the upper part of its course it is very rapid, shallow, and subject to inundations, of which that of 1829 was very destructive, but lower down its course is slower. The principal affluent is the Ury, or Urie. The Don was formerly much frequented by salmon of excellent quality: they ascended the stream at the end of September, and returned to the sea about the beginning of April. The salmon fisheries at Kintore, about 12 miles above its mouth, were of considerable value; but a great proportion of the fish are now intercepted by stake-nets at and near the mouth of the river. The salmon fishery of the Don is of less value than that of the Dee.

The Ythan rises near the north-western border of the county, and flows into the north sea after a course of about 36 miles. It is a slow and gentle stream; but from the more extensive system of drainage adopted in the lands through which it flows, it is subject to rise more suddenly than in former years. It has a considerable volume of water; but the shallowness of the mouth greatly impedes navigation. The river abounds with trout, finnock, eels, flounders, and salmon. There are two fishings for salmon, one at the mouth of the river, the other at the village of Ellon, about five miles up the stream; but the latter has become of little consequence from the introduction of stake-nets along the coast. Seals have been occasionally seen in the river, and mussels and cockles are taken yearly; formerly pearls were sometimes found there.

The Ugie is formed by two streams—the North Ugie and the South Ugie; which flow separately about 15 or 18 miles each, and then about six more after their union. From the trifling declivity and winding course of its channel the Ugie is a very slow stream: it is apt to overflow after falls of rain. It contains an abundance of trout, but few salmon are found in it. It is navigable only near the mouth.

The Deveron or Doveran has a course of about 50 miles, and in part separates Aberdeenshire from Banffshire. It is a rapid stream, flowing for a considerable part of its course through a deep narrow vale, and is subject to serious floods. It contains excellent trout. A considerable salmon fishery is carried on.

The other rivers and the lakes of the county are all very small.

The only canal is the Aberdeenshire Canal, which begins in the harbour of Aberdeen and terminates at the Don, close to the town of Inverury. This canal was opened in 1807: its length is 18¼ miles. It has a tide-lock, and seventeen other locks provide for a fall of 133 feet. The chief traffic is in lime, coal, dung, bones, and bark, carried up; and stone, slate, grain, and meal, brought down.

The chief roads are from Aberdeen to Edinburgh, Aberdeen to Banff, Aberdeen to Inverness, and Aberdeen to Perth. The Aberdeen railway and the Great North of Scotland railway will shortly give railway access to Dundee and to Inverness.

Soil and Agriculture.—The soil of the county varies much. In the united parishes of Braemar and Crathie, containing about 200,000 acres, and comprehending the highlands about the source of the Dee, the soil is loamy, generally dry, resting sometimes on dry yellow clay, but more frequently on gravel. From 10,000 to 11,000 acres are covered with wood, such as birch, alder, poplar, and mountain ash. The planted woods are chiefly larch and Scotch firs. The fir timber of the forest of Mar is, for size and quality, the first in the British Islands. The quantity of cultivated land is but small. The black-faced or Linton is the prevalent breed of sheep; the cattle are now of various kinds. Agriculture has been making steady progress for many years; and much land has been brought into cultivation by trenching and drainage. Lime is the general manure. The usual rotation of crops occupies seven years; oats are grown for two successive years, and are succeeded by turnips or some other green crop; the green crop is followed by bear or bigg, and hay; and the land is used for pasture for the two remaining years. The chief crops are oats and turnips. The farm-houses are commodious, and the offices are generally of a superior description, built of stone and lime, with slated roofs.

In the parishes between the Dee and the Don the principal farms are held on lease for nineteen years. The farms are from 50 to 150 acres, the generality of them about 100; besides which there are a number of 'crofts,' or small farms, of from 3 to 6 and occasionally of 10 or even 20 acres. Two-fifths of the district are under the plough. Drains, both open and covered, have been executed to a considerable extent. Most of the farm-houses and offices are tolerably substantial and commodious, built of stone, and roofed, in some cases, with slates. Much of the arable land is enclosed with dry stone walls and thorn hedges. Ploughing by horses has superseded that by oxen. The plantations are chiefly of the Scotch fir and larch. The chief animals reared are cattle, sheep, and horses. The cattle (mostly long-horned blacks or browns) are pastured and house-fed till about three years old, and then sent to England; the sheep are of the Leicester, the black-faced, and the Merino cross-breed; and the horses are hardy and small-sized.

Of the parishes near the coast probably four-fifths are under cultivation. The woodlands are unimportant; the wood is chiefly larch and Scotch fir. The soil varies much, being in some parts black peaty earth, in others deep retentive clay, and in others fertile loam. Great improvements have taken place in husbandry, which is generally very good. Draining, enclosing by ditches or stone dykes, the introduction of new manures, the substitution of the scythe for the sickle, the use of thrashing-mills and machines, of improved ploughs and other agricultural implements, and the erection of better farm-houses and offices, are the principal improvements. The cultivation of turnips has been greatly extended, in consequence of the facilities afforded by steam navigation for conveying fat cattle to the London market, and the consequent increase of stock; and this extended cultivation has been aided by the introduction and general use of bone-dust, which is found to answer admirably as a manure for light soils that have been long under cultivation. Oats and barley are much more cultivated than wheat.

Divisions, Towns, &c.—The county comprehends the five ancient districts of Mar, Formartin, Buchan, Garioch, and Strathbogie, which are not at present recognised for any administrative purposes. Mar, sometimes written Marr, comprehends that part of the county which lies south of the Don: it is subdivided into Braemar, Midmar, and Cromar. Formartin comprehends the country on the coast between the Don and the Ythan, and extends inland up the right bank of the Ythan to the border of Banffshire. The district of Buchan comprehends that part of the county which lies north and north-east of the Ythan. Garioch is an inland district, about the Urie and its feeders. Strathbogie is an inland district, comprehending the valley of the Bogie, and including part of the valley of the Deveron, near the junction of the Bogie. At present the county is divided for administrative purposes into the eight districts of Aberdeen, Alford, Deer or Buchan (comprehending only a part of the more ancient district of Buchan), Ellon, Garioch (more extensive than the ancient Garioch), Kincardine O'Neil, Strathbogie (less extensive than the older Strathbogie), and Turriff or Turreff. These modern districts are nearly coincident with the several presbyteries of the same name. The population of these districts, at the enumerations of 1831 and 1841, was as follows:—

	1831.	1841.
Aberdeen district, including the city and burgh of Aberdeen	69,778	76,938
Alford district	11,923	12,091
Deer or Buchan ditto	30,475	34,345
Ellon	12,831	14,418
Garioch	15,787	16,852
Kincardine O'Neil	15,415	14,987
Strathbogie	9,718	9,762
Turriff or Turreff	11,730	12,994
	177,657	192,387

The county contains the city and royal and parliamentary burgh of Aberdeen [ABERDEEN]; the royal and parliamentary burghs of Inverury, Kintore, and Peterhead; the burghs of barony of Charlestown, Fraserburgh, Huntly, Old Meldrum, Rosehearty, and Turriff.

Inverury is in the district of Garioch, 15 miles N.W. of Aberdeen, on the left or north bank of the Don, in the angle formed by the junction of the Urie. There is a substantial modern bridge over each stream. The town consists of a long straggling street. There is a small old church and a larger new one, an Episcopalian chapel, and places of worship for Independents and Methodists. The population of the burgh, which includes the town and the suburb of Port Elphinstone, was 1619 in 1841. The opening of the Aberdeen canal has much promoted the prosperity of the place. The burgh has a provost, three baillies, a dean of guild, a treasurer, and three councillors. It is included in the Elgin district of parliamentary burghs.

Kintore is in the district of Garioch, 12 miles N.W. of Aberdeen, in the peninsula formed by the Don, the burn of Tuach, which joins the Don on the right bank, and the Torry burn, which flows into the Tuach. The town consists chiefly of one street. There is a bridge over the Torry burn, and two bridges over the Aberdeen canal. There is a church and a town-house. The burgh, which comprehends the town, contained in 1841 a population of 464 persons: the whole parish had a population of 1187, excluding the population of Port Elphinstone (112 persons), which is in this parish, though comprehended in the burgh of Inverury, and the population returned with it. The trade of Kintore is promoted by the Aberdeen canal, which passes close to the town, and upon which there is a wharf. The burgh is very ancient. Kintore belongs to the Elgin district of parliamentary burghs.

Peterhead is in the district of Deer, on the east coast, 32 miles N.N.E. of Aberdeen. It stands on a peninsula running into the North Sea, on the south side of the mouth of the Ugie: the two harbours, the new north harbour and the south

harbour, are near the south-eastern extremity of the peninsula, in opposite sides of which they are formed. The south harbour is the oldest, having been formed in 1773, according to a plan of Mr. Smeaton, afterwards extended by Mr. Rennie, and covers about 6½ acres; the new north harbour was formed in 1818, from a plan of Mr. Telford, and covers almost 11 acres: both harbours are furnished with quays, and protected by piers. The town had in 1841, within the burgh limits (which include the suburb of Ronhends and the village of Buchan-haven, both inhabited chiefly by fishermen), a population of 4586, and that of the whole parish 7619. The streets of the town have been much improved of late years, and are lighted with gas. The houses are generally of granite, which is quarried near the town. The principal public building is the town-hall. The market-cross is a granite pillar, of the Tuscan order. The church (built in 1803) has a spire of granite 118 feet high: there is a large Episcopalian chapel (erected in 1814), and there are smaller places of worship for the Associate Seceders, Independents, and Methodists. There is but little manufacture, but the trade of the town is considerable. The number of vessels belonging to the port on the 1st of January, 1837, was 82, with an aggregate burthen of 11,122 tons. Granite, of excellent quality, is quarried in the neighbourhood. Peterhead is a burgh of barony, erected by charter of the Earl Marischal in A.D. 1593. By the Burgh Reform Act the municipal government is vested in a council of twelve, who choose from their own number a provost, three baillies, and a treasurer. Peterhead is a parliamentary burgh in the Elgin district.

Charlestown or Charleston, distinguished as Charleston of Aboyne, is near the Dee, 20½ miles W. by S. of Aberdeen. It is a very small place, which had in 1841 a population of 260. Near it is a suspension bridge over the Dee, erected by the Earl of Aboyne, at his own expense, in the place of one destroyed by the great floods in 1829.

Fraserburgh is on the north coast of the county, 42 miles N. of Aberdeen. The town is built on the western side of a small bay. The town consists of streets crossing at right angles, clean, and in good condition. The population in 1841 was 3289; but the town was not, in the return, distinguished from the rest of the parish. The town-house, the market-cross, and the tolbooth (the last now falling into ruins) were all erected by Sir Alexander Fraser, from whom the town derives its name. The parish church is in the middle of the town; and there is an Episcopalian chapel and an Independent meeting-house. The harbour is formed by three piers, and has a depth of water, at the pier heads, of 6 feet at low water and 20 feet at high water of spring-tides. The bay affords good anchorage. There is a lighthouse on Kinnaird's Head. Eight vessels, of from 45 to 155 tons burden, belong to the port; and there are 220 boats engaged in the herring fishery, which employs 1600 people. The burgh officers are two baillies, a dean of guild, a treasurer, and seven councillors.

Huntly is in the district of Strathbogie, on the

S.E. side of the Deveron or Doveran, in the angle formed by the junction of the Bogie, 38 miles N.W. from Aberdeen, on the road to Inverness. It is a burgh of barony under the earls (now marquises) of Huntly. The town is surrounded by hills, and consists of streets regularly laid out and lighted with gas, the two principal intersecting each other at right angles, with a square or market-place at the intersection. It had in 1841 a population of 2731. The parish church, built in 1805, will accommodate 1800 persons; and a new church, which will hold nearly 1000, was erected in 1840; there are Roman Catholic and Episcopalian chapels, and meeting-houses for Independents and Associate Seceders. There are two good bridges, one an ancient bridge of one arch over the Doveran, the other a bridge of three arches over the Bogie.

Old Meldrum is in Meldrum parish, in the district of Garioch, 18 miles N.N.W. from Aberdeen, on the road to Banff. The parish had in 1841 a population of 1873; but the town is not distinguished, in the return, from the rest of the parish. Old Meldrum was erected into a burgh of barony by a charter obtained in 1672, but there are no magistrates or burgh officers now. The town-house and the town-hall are respectable buildings. The parish church is close to the town.

Rosehearty, in Pitsligo parish, in the district of Buchan or Deer, is on the northern coast of the county, about 4 miles west of Fraserburgh. It was created a burgh of barony by royal charter in 1681, but the burgh has no magistrate or public officer. The parish church, built in 1634, will hold about 500 or 600 persons. The burgh in 1841 had a population of 750. There is a good harbour for vessels not exceeding 70 tons. The herring fishery employs about 40 boats, with five men each, and other fish are caught, and sent to London, Edinburgh, or Glasgow.

Turriff, in the parish and district of Turriff, is about 11 miles south of Banff, on the Turriff burn, which joins the Doveran. In 1841 it had a population of 1309. The parish church, a handsome structure, was built in 1794, and has been since enlarged. A cross of considerable antiquity stands in the principal street. There are three banks, a gas company, and a local post-office. Turriff was created a burgh of barony by charter in 1511, with a grant for markets and fairs.

The following villages may be briefly noticed. Ballater, in Glenmuick parish, 41½ miles W. from Aberdeen, on the north bank of the Dee, is of recent origin, and is much resorted to on account of the beauty of the situation, and the mineral springs of Pananick in the neighbourhood. The population in 1841 was 371. The parish church is in the village, and there is a post-office. Boddam, or Boddan, 3 miles S. from Peterhead and in Peterhead pasish, in the district of Buchan, is near Buchan-head, on which there is a lighthouse of granite, 118 feet high. Boddam has two small harbours; the south harbour will receive ships of a moderate draught of water. The population in 1841 was 526. Newburgh, in Foveran parish, in the district of Ellon, 10 miles N. from Aber-

deen, in 1841 had a population of 393. The village stands on the burn of Foveran, near its junction with the Ythan, the mouth of which forms the port of Newburgh, to which eight small vessels belong. Newbyth, or New Byth, is in the parish of King Edward and district of Turriff, 13 miles S.E. from Banff. It had in 1841 a population of 1369, of whom about 300 are in the village. Strichen, Mormond, and New Leeds are in the parish of Strichen, in the district of Buchan. Strichen is well built, and has a neat town-house, a commodious church, a branch bank, a savings' bank, and a post-office. Mormond is regularly built, with a number of good, commodious, slated houses. The population of New Leeds in 1841 was 203; that of the other villages was not distinguished in the return. Stuartfield, or Stewartfield, in the parish of Old Deer, in the district of Buchan, had in 1841 a population of 614.

Divisions for Ecclesiastical and Legal Purposes.—The county is for the most part included in the jurisdiction of the Synod of Aberdeen, which comprehends, in addition, nearly the whole of Banffshire and part of Kincardineshire. The number of parishes wholly or partly in this county according to the Population Returns of 1841 is 90. These are parishes both for ecclesiastical and civil purposes. There are besides 14 'quoad sacra' parishes, that is, districts dismembered from the above, and constituted distinct parishes for ecclesiastical purposes alone; 10 of these quoad sacra parishes have been formed in the city of Aberdeen.

There are two universities, namely, King's College, in Old Aberdeen, and Marischal College, in New Aberdeen. [ABERDEEN.] The shire is well supplied with schools.

There is a county prison and a bridewell at Aberdeen, and small burgh prisons at Old Aberdeen, Old Meldrum, Inverury, Kintore, Peterhead, and Fraserburgh; but these are used only occasionally and for very brief confinement. There is a new prison at Peterhead.

The county of Aberdeen returns one member to Parliament; the number of electors of all qualifications in 1835-36 was 2986; in 1839-40, 3181. The city of Aberdeen returns one member. Peterhead, Inverury, and Kintore are included in the Elgin district of burghs, which returns one member; the other burghs of the district are Elgin, Cullen, and Banff.

History and Antiquities.—At the earliest historical period, Aberdeenshire was occupied by the Taezali of Ptolemy. The south-western part of the county was probably included in the territory of the Vacomagi of Ptolemy. The Ituna of Richard of Cirencester may be identified with the Ythan. Of the most ancient period of its history Aberdeenshire contains various monuments; such as cairns, barrows, Druidical stones, and the structures sometimes called Picts' houses. There are also some ancient camps, two or three of which are supposed to be Roman.

The principal events of the middle ages and of later days were—the battle of Cruden, in the beginning of the eleventh century, between the Scots under Malcolm II., and the Danes under Canute, afterwards king of England. In 1411, during the captivity of King James I. and the regency of the duke of Albany, the bloody battle of Harlaw, in Chapel of Garioch parish, was fought between 10,000 highlanders, under Donald, Lord of the Isles, and the royal forces (lowlanders), under the earl of Mar, in which Donald was completely defeated. In the great civil war of Charles I., A.D. 1644, Montrose defeated the Covenanters under Lord Burley, not far from Aberdeen, which he entered. Monk occupied Aberdeen in 1651; and the troops of the Pretender, under Lord Lewis Gordon, occupied it and levied contributions on it in 1745.

The principal memorials of the middle ages are the ruins of feudal castles. On the north coast, between Fraserburgh and Banff, are the remains of the ancient castle of Dundargue, situated on a red sandstone rock, which rises from the sea to the height of above 60 feet, and is connected with the mainland, at high water only, by a narrow ledge of rock. On the same coast, near Banff, are the remains of Ken-Edgar Castle, once the seat of the Comyns, or Cumins, earls of Buchan. Pitsligo and Pitullie castles are both on the coast near Fraserburgh. Craigston Castle, in the same neighbourhood, built in the seventeenth century by one of the Urquharts of Cromarty, is a fine old building in good preservation. Fedderessett Castle, near New Deer, was a fortress of considerable strength. On the eastern coast are the ruins of Slains Castle, once the seat of the earls of Errol; and on the north-eastern bank of the Ythan stands Fyvie Castle, one of the finest Gothic edifices in the county. There are numerous other ruins of ancient castles or towers. The monastic and other ecclesiastical remains are very few.

(*New Statistical Account of Scotland; Gazetteer of Scotland*, published by Fullarton and Co., of Edinburgh; *Parliamentary Papers.*)

ABERDEVINE, or Siskin (*Carduelis spinus*, Cuv.; *Fringilla ligurina*, Ranzine; Le Tarin, Buff.)

The Aberdevine.

The Aberdevine, or Siskin, is one of the Finch tribe, and a native of the northern regions of Europe, as Norway, Sweden, and the north of Germany, whence in severe winters it migrates southwards, visiting the British islands, sometimes in considerable flocks, associated with the lesser redpole, and feeding upon the seeds of the birch and alder. Though this bird must be regarded rather as a winter visitant to our island

than a permanent resident, yet there are not wanting instances of its breeding within our shores. Mr. Selby assures us that it is ascertained to breed in some of the pine-woods in the highlands of Scotland. 'Near Killin,' he says, 'these birds were observed by Sir W. Jardine and myself to be in pairs in the month of June, inhabiting a wood of very old and lofty pines, but we were unable to procure the nests from the height and inaccessible nature of the trees.' This confirms Temminck's account, who states that the siskin builds in the highest branches of the pine, and not (as Sepp has delineated its nest) in the clefts of the oak; the eggs are bluish white, speckled with purplish red.

The Siskin or Aberdevine soon becomes familiar in captivity, and utters a trifling though not unpleasing twitter; it is sometimes paired with the canary, a mule progeny being the result. The colours of the male, in full plumage, are as follows:—Top of the head, black; ear-coverts, dusky; a line above the eye; sides of neck, throat, and chest, lemon yellow; back and shoulders, dark olive green, with obscure dusky dashes; quills, brown, with an oblique yellow bar, and another above produced by the yellow edging of the greater coverts; flanks, dusky, with a few brown dashes; rump, yellow, slightly washed with green; two middle tail feathers, dark brown, the rest yellow, tipped with brown; bill and legs, horn colour; length, 4¾ inches; tail, short and forked. The plumage of the female is far less bright, and less decidedly marked.

* ABERGAVENNY, a town in the county of Monmouth, is situated at the confluence of the Usk and Gavenny in 51° 49′ N. lat., 3° 1′ W. long. There is a fine old bridge, of fifteen arches, over the Usk; also an ancient and spacious church, as well as the remains of a castle, and of a Benedictine priory founded soon after the Conquest. The town is long and straggling, the streets narrow, and the houses irregularly built; but considerable improvements have been made by enlarging the market-place and removing projections. There are several Dissenters' meeting-houses and a Roman Catholic chapel. The grammar-school was founded by letters patent of Henry VIII., July 24, 1543. The principal trade is in wool. The supply of coal and iron from the neighbouring mountains has given rise to several iron-works in the surrounding district. The population of the town in 1841 was 2720. The Monmouthshire and Brecon canal passes near the town, and gives facilities for its trade and that of the neighbourhood. Abergavenny is 14 miles W. by N. of Monmouth, and 143 W. by N. of London.

ABERNETHY, JOHN, surgeon, was born in London, in the year 1765. He died at Enfield, after a protracted illness, on the 18th of April, 1831. At the usual age he was apprenticed to Sir Charles Blick, surgeon to St. Bartholomew's Hospital, under whom, and especially in the wards of this hospital, he had ample opportunities of acquiring a thorough knowledge of his profession, of which he availed himself with diligence. Competent judges, who observed at this early period the qualities of his mind and his habits of study, predicted that he would one day acquire fame if not fortune. Though he appeared before the public early as an author, and though his very first works stamped him as a man of genius, endowed with a philosophical and original mind, yet he did not rise into reputation nor acquire practice with rapidity. In 1787 he succeeded Mr. Pott as assistant-surgeon to St. Bartholomew's Hospital, and shortly afterwards took the place of that gentleman as lecturer on anatomy and surgery, and on the death of Sir Charles Blick, he was elected surgeon in his room; and, subsequently, St. Bartholomew's Hospital obtained under him a reputation which it had never before acquired.

Abernethy was one of the first surgeons who pointed out the fact that local diseases may have a constitutional origin. In a work abounding with acute and original observation, and exhibiting comprehensive and philosophical views, entitled, 'The Constitutional Origin and Treatment of Local Disenses,' he lays down and establishes this great principle—that local diseases are symptoms of a disordered constitution, not primary and independent maladies; and that they are to be cured by remedies calculated to make a salutary impression on the general frame, not by topical dressing, nor any mere manipulations of surgery. This principle influenced the entire field of surgery, and gave a great impulse to its improvement. And to this first principle he added a second, the range of which is less extensive, but the practical importance of which is scarcely inferior to that of the first—namely, that this disordered state of the constitution either originates from or is rigorously allied with derangements of the stomach and bowels, and that it can only be reached by remedies which first exercise a curative influence upon these organs.

The same philosophical view of the structure and functions of the human frame, which enabled Abernethy so greatly to improve the theory and practice of surgery, suggested, and at the same time armed him with the courage to perform, two operations in surgery bolder than any that had ever before been achieved, and the repetition of which has since been attended with frequent success—namely, the tying the carotid and the external iliac arteries. The announcement of the performance of these capital operations, at once established his reputation as a surgeon, and increased the credit of the English school throughout Europe.

Great however as was the reputation which this distinguished man acquired as an anatomist, physiologist, and surgeon, it is probable that he owed his celebrity chiefly to his success as a teacher. Gifted with the genius to master and extend his science, he was endowed with the still rarer capacity of communicating to others in a clear, succinct, impressive, and fascinating manner, whatever he himself knew. Easy and fluent, yet not inelegant—abounding with illustration and anecdote, yet methodical—logical, yet often witty, and occasionally humorous almost to coarseness—seldom impassioned, yet always impressive, and never allowing the attention of his audience

to flag for a single moment,—it was rare indeed that he failed to convince whoever heard him, and as rare that he failed to make whoever was convinced a decided partizan.

The private character of Mr. Abernethy was blameless. He was highly honourable in all his transactions, and incapable of duplicity, meanness, artifice, or servility. His manners in the domestic circle were gentle, and even playful; he gave to those about him a large portion of what his heart really abounded with—tenderness and affection; and on his part he was tenderly beloved by his children, and by all the members of his family. In public, and more especially to his patients, his manners were coarse, capricious, churlish, and sometimes even brutal. It would not be difficult to account for this anomaly were there any use in pursuing the investigation: his conduct in this respect merits the most unqualified censure.

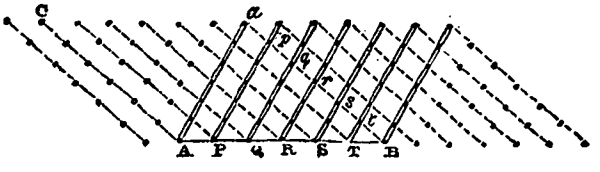
(For a list of the various Tracts published by Mr. Abernethy, see Watt's 'Bibliotheca Britannica,' and 'Biographical Dictionary.' A collected edition of his surgical works appeared in 1815, in 2 vols. 8vo.)

ABERRATION, in Optics, is a deviation of the rays in a pencil of light, from a single point in the axis of the pencil; the rays, after diverging from a radiant point, being reflected from the surface of a concave mirror, or refracted in passing through a convex lens. The deviation, in lenses, is caused partly by the spherical form which is

usually given to them, and partly by the differently coloured rays in a pencil suffering different degrees of refraction in transparent media: it is, therefore, of two kinds, which are called respectively, *spherical aberration* and *chromatic aberration*. [APLANATIC; FOCUS; LENS; SPECULUM.]

ABERRATION OF LIGHT, an astronomical phenomenon, being an apparent alteration in the place of a star, arising from the combined motion of the spectator and of the light which brings the impression of the star to his eye. We should, however, premise, in order that the reader may not form too large a notion of aberration, that it is never so much as 21″.

Let us suppose the rays of light to move so slowly that a spectator can be furnished with a tube long enough for the light to take some perceptible time in passing from one end of it to the other. This will do for our purpose, since, though, by such a supposition, the aberration will be very much increased, yet the effect, and the reason of it, will be of the same kind as if light were supposed to have its real velocity. The star being at an immense distance, the rays which reach the spectator in different parts of the second may be called parallel, without sensible error. Thus, while in one second the spectator moves from A to B, he receives rays of light in the direction indicated by the dotted lines. The question now is, in what direction must he hold the tube, so as to see the star through it? If he were at rest, that direction would evidently be AC.



Let AB be the line described by the spectator in one second, during which time let a ray of light move from *a* to B, or from C to A. Join A*a*, and let A*a* be the length and direction of the tube. Divide the second into any number of equal parts, say six, and carry the tube into the various positions which it will successively occupy. Consider a ray of light as a succession of little particles moving one after another in a straight line. Then when the eye has come to P, the particle *a* will have come to *p*; when the eye is at Q, the particle will be at *q*, and so on. We have then so placed the tube, that its motion will not interfere with that of the ray, which moves as freely in the moving tube as it would do if there were no tube. To the spectator, who does not perceive his own motion, the tube is stationary, and the ray of light appears to come down it; therefore A*a* will be the direction in which he sees the star, instead of AC. The angle C A *a*, contained between the real and apparent directions is what is called the *aberration*. Here *a* A is the diagonal of the parallelogram B *a* C A, in which *a* C is equal and opposite to AB. To apply this, we must remark—

1. That the above figure is much distorted, since AB is not the ten thousandth of *a* B; whence the aberration will be very small.

2. That the aberration is in the plane passing through AB, the line of the earth's course for the moment, and through the real direction AC of the star; whence, as the earth changes the direction of its motion in going round the sun, the direction of the aberration will also change.

3. That we have committed an error in supposing the lines AC and B*a* to be parallel, since they meet at the star; which error, on account of the star's enormous distance, will be imperceptible.

4. That AB is not properly the spectator's motion round the sun only, but compounded of that and his motion round the earth's axis: the latter, however, being at most not one-third of a mile in a second, while the former is eighteen miles per second, does not produce any sensible aberration.

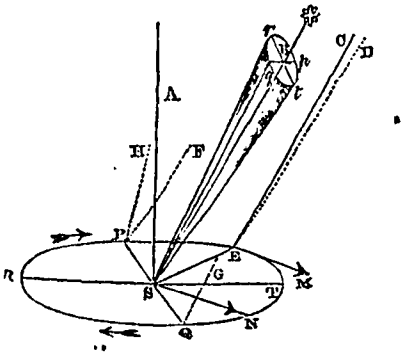
5. The real direction, AC, of the light may be considered as the same at every part of the earth's orbit, on account of the distance of the star.

6. The aberration always throws the star apparently nearer to the earth's course, that is, A*a* is always within the angle CAB.

7. The aberration is greater or less according

as the angle CAB is nearer to or further from a right angle, and is greatest when CAB is a right angle. This result may readily be proved by those who understand trigonometry, if they recollect that AB and αA are given, being the velocity of the earth and the *apparent* velocity of light, and that

$$\sin A\alpha B, \text{ or } \sin CA\alpha = \frac{AB}{\alpha A}\sin \alpha BA = \frac{AB}{\alpha A}\sin CAB.$$



Let us suppose, which will be exact enough for our purpose, that the earth moves in a circle (the ecliptic), of which the sun is in the centre. The line SA, perpendicular to the plane of the ecliptic, looks towards the *pole* of the ecliptic. Let SB be the direction of a star, PSQ perpendicular in the plane of the ecliptic to SB, and RST perpendicular to PSQ in the same plane. When the earth is at E, it is moving in the direction EM perpendicular to SE, and the star, from its great distance, is in the direction EO parallel to SB. Hence the aberration takes place in the plane, OEM, that is, the star little lowered towards EM, and appears in the direction ED. Let the needle SN move round the circle with the earth, so as always to indicate the direction in which the earth is moving, that is, SN is always parallel to EM, and perpendicular to SE. The plane B S N being parallel to the plane O E M, is the plane in which aberration would appear to take place if the spectator were at S, and S were moving; but as the spectator does not perceive his own motion, let us suppose him placed at S, and the same aberration to take place in the plane BSN, which really does take place in CEM. By what has been said, the aberration is greatest when the needle points to Q or P, that is, when the earth is at T or R; and least, when the needle points to T or R, that is, when the earth is at P or Q; because the angle BSN is a right angle when N is at P or Q; and differs most from a right angle when N is at T or R. Hence the aberration increases as the earth moves from P to T, diminishes from T to Q, increases from Q to R, and decreases again from R to P. The line in which the star appears, moves round SB in the course of a year, and describes a cone, while the star appears to describe a small oval or ellipse about B, the greater axis of which is parallel to PQ, and the lesser to RT; such as *p r q t*, in which *p* is the apparent place when the earth is at P, and so on. This deviation is completed in the course of a year.

When the star itself is in the pole of the ecliptic, or is seen in the direction SA, the angle ASN is always a right angle, the aberration is always of the same magnitude, and the apparent path of the star is a circle. As we take stars in which SB is more inclined to the ecliptic, the oval becomes flattened in proportion to its length, so that when the star is in the ecliptic, it appears to vibrate backwards and forwards in a straight line, going and returning once in each year.

If the star be on the solstitial colure, the points P and Q will be the equinoxes, and R and M the solstices. The aberration will consequently be greatest at the solstices, and least at the equinoxes.

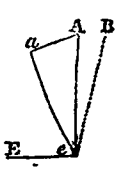
The stars appear to us to lie on a large sphere, of which we are the centre. We may represent the phenomenon on a common globe by drawing a small ellipse or oval round the star, the major axis of which is parallel to the ecliptic, and the figure of which is more or less flattened as the star is nearer to, or further from, the ecliptic. The major axis will always be an arc of 41″, and the minor axis will be 41″ multiplied by the *sine* of B S T or the star's latitude. [BRADLEY.]

The greatest aberration, as we have observed, is parallel to the ecliptic, and is the greatest semidiameter of the apparent annual ellipse of a star. This ought to be the same for all stars, if the rays which come from them move with the same velocity. Hitherto it has not been discovered that the greatest aberrations of different stars differ by more than may reasonably be imputed to instrumental errors; we must therefore conclude that, as far as we know, the light of every star moves with the same velocity. Bradley made the greatest aberration 20″; others have deduced different values, varying from $20\frac{1}{4}''$ to $20\frac{7}{10}''$; but the best recent observations make it extremely near to $20\frac{1}{4}''$; which result is the more entitled to confidence, as it does not differ more than one-tenth of a second from the mean of all the results previously obtained.

It is well known that solar light is composed of several colours, which admit of separation from one another. The light of the stars is also compounded of several colours; for though different tinges predominate in different stars, no one gives a perfectly pure colour. The phenomenon of aberration proves that these different lights move with the same velocity; for two lights, moving with different velocities from the same star, would give different quantities of aberration; that is, would make differently coloured images of the star in different places, that image being nearest to the real place of the star, the colour of which moves with the greatest velocity. But as no indication of such an appearance is observable in the very best telescopes, we are, therefore, bound to conclude, that all the different coloured light of which white light is composed, moves with the same velocity.

We have hitherto considered only the case of a star which has no motion of its own; let us now take that of a planet, comet, or the moon, which

moves while the earth moves. Let the planet move from A to *a*, and the earth from E to *e*, in the time which it takes the light to move from the planet to the earth. Then, by what has been said, the earth at *e* receives the ray. A*e*, which is imagined to be in the direction B*e*; and if the planet had remained fixed at A, A*e*B would have been the aberration, or the angle contained between its true and its apparent direction. But in the meanwhile the planet has moved to *a*, and if light were transmitted instantaneously, would appear in the direction *e a*. Hence *a e* B is the aberration: that is, to the former angle, the planet's motion round *e*, during the passage of the light, must be added or subtracted, according as the earth and planet move in the contrary or same directions. The greatest aberration of Mercury is nearly one minute; that of the moon only two-thirds of a second. To the sun, which has no motion of its own, the rule for a star in the ecliptic may be applied; recollecting, however, that as a line drawn from the sun to the earth is always at right angles, or very nearly so, to the direction of the earth's motion, the aberration is always at its greatest value, or nearly so, and is nearly 20½″.



ABERYSTWITH, a town on the coast of Cardiganshire, in South Wales, on a kind of peninsula, between the river Rheidiol and the sea. The river Ystwith, from which the town takes its name, enters the sea about half a mile from the embouchure of the Rheidiol; but there is a tradition that the sea has here encroached on the land, and there may have been a town formerly at the outlet of the Ystwith. Aberystwith was formerly defended by walls and a castle, but they are now in ruins. The streets are narrow, and the houses covered with the black slate of the county. An act for improving the town, and supplying it with water, was passed in 1835. It is a busy place; and in addition to its commerce, and its fisheries of cod, whiting, herring, and mackarel, some woollen manufactures are carried on, and small vessels built. The harbour is small, and a bar keeps out vessels of large size. In 1836 an act was passed for altering and amending an act for repairing, enlarging, and preserving the harbour. The vessels belonging to the port amounted, in December 31, 1845 (according to a Parliamentary Return), to 158, the average burthen of which was 7824 tons. Population, in 1831, 4128; in 1841, 4916. Aberystwith is in the Cardigan district of boroughs, and returns one member to Parliament. Aberystwith is 39 miles N.E. from Cardigan, and 208 W.N.W. from London, 52° 25′ N. lat., 4° 5′ W. long.

ABEYANCE is a legal term, derived from the French *bayer*, which, says Richelet, means to 'look at anything with mouth wide open.' Coke (Co. Litt. 342, b.) explains the term thus, '*En abeiance*, that is, in expectation, of the French *bayer*, to expect. For when a parson dieth, we say that the freehold is in abeyance, because a successor is in expectation to take it; and here note the necessity of the true interpretation of words. If tenant *pur terme d'autre vie* dieth, the freehold is said to be in abeyance until the occupant entereth. If a man makes a lease for life, the remainder to the right heirs of J. S., the fee-simple is in abeyance until J. S. dieth. And so in the case of the parson, the fee and right is in abeyance, that is, in expectation, in remembrance, entendment or consideration of law, in considerantione sive intelligentia legis; because it is not in any man living.'

The expression that the freehold or the inheritance of an estate is in abeyance, means that there is no person in whom the freehold or the inheritance is then vested, and that the ownership of the freehold or of the inheritance is waiting or expecting for an owner who is to be ascertained. This doctrine of the suspense of the freehold or of the inheritance, is repugnant to the general principles of the tenure of land in England. By the old law, it was always necessary that some person should be in existence as the representative of the fee or freehold, for the discharge of the feudal duties, and to answer the actions which might be brought for the fief; and thus the maxim arose that the freehold of lands could never be in abeyance. Still it was admitted that both the inheritance and the freehold might in some cases be in abeyance. Thus, in the case of glebe lands belonging to parsons, and of lands held by bishops and other corporations sole, it is said that the *inheritance* must always be in abeyance, as no one can, under any circumstances, be entitled to more than an estate for life in these lands; and during a vacancy of the church, it is said that the freehold is in abeyance, for there is then no parson to have it, and it is said that the freehold cannot be in the patron, who, though he possesses a right to present to the benefice, has no direct interest in the land annexed to it.

Titles of honour are also sometimes said to be in abeyance, which occurs when the persons next in inheritance to the last possessor are several females or co-parceners. In this case the title is not extinct, but is said to be in abeyance; and may be revived at any time by the king. Several instances of the exercise of this prerogative are on record both in ancient and modern times. But the correct doctrine appears to be that in this supposed case of a dignity, it reverts to the crown, which may grant it again. (Cameys's Case, 5 Bing. *New Cases*, 754; Coke upon Littleton, 165; Cruise, *Digest*, i., 52, 55.)

ABIB (Hebrew Month). [YEAR.]

ABIES, in Botany (the *Fir*), a genus of trees of the coniferous tribe, well known for the valuable timber which is produced by many of the species. It was formerly considered a part of the genus Pinus; but modern botanists have made it a separate genus.

From *Pinus*, or the pine-tree, the fir is obviously distinguished by its more pyramidal form, by its leaves arising singly from around the stem, not by twos, or threes, or a greater number, from out of a membranous shrivelling sheath, and by the characters of its fructification. Its species form four very natural tribes, of the first of which

the Silver Fir may be taken as the representative; of the second, the Norway Spruce; of the third, the Larch; and of the fourth, the Cedar of Lebanon. Most of these are interesting either for the excellence of their wood, or as objects of ornament: we shall briefly notice the most interesting.

Sect. I. Leaves growing singly round the branches, and all turned towards one side.—Silvers.

Abies Picea, the Silver Fir, is a native of the mountains of the middle and south of Europe, in stony, dry, exposed situations. Its favourite district seems to be on the Pollino and in the forest of Rubia, in the kingdom of Naples, where it is found in all its grandeur, often growing from 130 to 150 feet in height, and richly meriting the name *pulcherrima* (most beautiful), applied to it by Virgil. This tree is readily known by its leaves having their points all turned towards the sky, and being mealy underneath, as well as by its long, erect, stalkless cones, of a greenish-purple colour, bristling with reflexed taper points of the bracteæ that subtend the scales. It is the *sapin* of the French. Planks of indifferent quality, on account of their softness, are sawn from its trunk, which also yields Burgundy pitch and Strasburg turpentine. For its successful cultivation in this country it requires strong land, such as will suit the oak, and a sheltered situation; it will then become a very large tree.

Abies Balsamea, the Balm of Gilead Fir, is found, along with *Abies nigra* and *alba*, in the coldest parts of North America, but always as individuals, and never in large masses. The English name has been given in consequence of a resemblance between the clear transparent greenish-yellow turpentine, which is obtained from numerous cysts in its bark, and the Balm of Gilead of the shops. This turpentine is commonly known under the name of *Canadian Balsam*.

Abies Webbiana, Webb's Fir. According to the account of Captain Webb, who first discovered it, this remarkable species attains the height of eighty or ninety feet, with a diameter near the ground of three or four feet. Its wood seems to be valuable; in India it is used by plane-makers. From what has been reported of its general appearance, it is probably one of the most interesting species that has yet been discovered. Inhabiting the colder regions of northern India, and found among a flora that is more Siberian in its character than Indian, there can be no doubt of its being well able to stand the winters of this country.

Abies Canadensis, the Hemlock Spruce Fir. The most northerly situation in which this tree is found is about Hudson's Bay, in 51° N. lat. Near Quebec it forms extensive forests; in Nova Scotia, New Brunswick, Vermont, and the upper part of New Hampshire, it is very common; but in the middle and southern states it is confined to the Alleghanies and their dependent ridges, where it inhabits the sides of torrents and the bleakest situations. It is a noble species, rising to the height of seventy or eighty feet, and measuring from two to three feet in diameter. It appears to be of slow growth, not arriving at its full dimensions in less than 200 years. The wood is of little value, being neither sound nor durable: it is chiefly employed for the manufacture of laths and for coarse in-door work. The bark is exceedingly valuable for tanning; mixed with oak bark, it is said to be much better than oak bark alone. It bears clipping well, and is therefore adapted, like the yew, to the construction of live fences. A great deal of the Essence of Spruce is extracted from its shoots.

Sect. II. Leaves growing singly round the branches, and all spreading equally.—Spruces.

Abies excelsa, the Norway Spruce Fir, is a native of the mountainous parts of the north of Europe, where it sometimes constitutes, as in Norway, the principal timber. It is found all over Siberia as high as 70° N. lat.; in that region it is considered by the wandering tribes a certain sign of the presence of springs of fresh water, for it is only seen in moist and springy places; a property transferred to Abies picea by the late Sir James Smith, who has most strangely misapplied the statement of the Russian botanist Gmelin. When in perfection, and occasionally it arrives at its greatest perfection in this country, it acquires a height of 150 feet. The wood is of a white colour, of a fine even grain, and very durable: in the market it is known under the name of White or Christiana Deal. In Norway it arrives at maturity in seventy or eighty years. Trees of such an age are what are usually cut down for exportation, and each yields on an average three pieces of timber eleven or twelve feet long. The spruce is readily known by its leaves of one uniform dull green colour, spread equally round the branches, and by its long pendant cones.

Abies alba, the White Spruce Fir, is found along with *Abies nigra* in the colder regions of North America. According to Michaux, it does not advance so far to the northward as that species, from which it is known not only by its smaller size, the trunks rarely exceeding forty or fifty feet in height, but also by the bluish cast which characterizes the foliage, and which gives it a much lighter appearance than the sombre *Abies nigra*: Dr. Richardson however states that it was the most northerly tree observed in Franklin's Polar journey. The timber is of inferior quality. From the fibres of the root, macerated in water, the Canadians prepare the thread with which they sew together the birch bark that forms their canoes. Its resin is also used to render the seams water-tight. The bark is said to be occasionally used for tanning.

Abies nigra, the Black or Red Spruce Fir, is a native of the most inclement regions of North America, especially in swampy situations, and in the valleys between ridges of low hills, where the soil is deep, black, and humid. From its young branches is extracted the Essence of Spruce, so well known as a useful antiscorbutic in long voyages, and not from those of the Abies alba, according to Michaux. By some it has been thought that North America produces a red as well as a

black spruce, the former being of better quality than the latter; but the researches of Michaux show that such differences as exist are due exclusively to the influence of soil, and have no dependence upon specific peculiarities.

Abies Douglasii, the Douglas Fir. According to Mr. Douglas, the discoverer of this gigantic species, it is found in immense forests in North-West America, from 43° to 52° N. lat. The trunks vary from 2 to 10 feet in diameter, and from 100 to 180 feet in height. Occasionally it arrives at still greater dimensions; there still exists, near Fort George, on the Columbia River, a stump which, without the bark, and at 3 feet from the ground, measures 48 feet in circumference. It is an evergreen tree, with an erect taper trunk, which, when old, is covered with a rough, rugged bark from 6 to 9 inches thick, abounding in a clear yellow resin, and making excellent fuel. The young branches have their bark filled with receptacles of resin, as in the balm of Gilead. The timber is heavy, firm, of as deep a colour as yew, with very few knots, and not in the least liable to warp.

Sect. III. Leaves growing in clusters; deciduous.—Larches.

Abies Larix, the Common Larch Fir, is a native of the mountains of the middle of Europe, of Russia, and of Siberia. In the latter country it is the commonest of all trees, delighting in dry elevated situations, where it forms vast forests, sparingly intermixed with pines. Its trunk grows very erect, with graceful drooping branches, gradually diminishing from the base to the apex, and giving it a regularly pyramidal form. In the spring, when its young leaves have just burst into life, it has a peculiar bright yellowish-green tint, which is possessed by no other tree of our forests. The larch has been now, for many years, extensively cultivated upon barren exposed land, both in England and Scotland, and it has been found one of the most profitable of all trees to the planter, provided the land be well drained; but it will not succeed in swampy situations. It grows with great rapidity, is subject to very few accidents, transplants with little risk, and produces timber of great excellence and value, not only for domestic but for naval purposes. In mountainous districts in Scotland the Dukes of Athol have planted it in immense quantities; and it appears, from a report of one of those noblemen to the Horticultural Society, that in situations 1500 to 1600 feet above the level of the sea, he has felled trees, eighty years old, that have each yielded six loads of the finest timber. Three varieties are mentioned by botanical writers; of these the first is remarkable for the young cones being pale green instead of crimson; the second has a weeping habit: both these are natives of the Tyrol. The third sort is of a slow stunted growth, and an inelegant appearance, leafing early, and very subject to injury from spring frosts; it was raised by one of the Dukes of Athol from Archangel seeds.

From the boiled inner bark, mixed with rye-flour, and afterwards buried for a few hours in the snow, the hardy Siberian hunters prepare a sort of leaven, with which they supply the place of common leaven when the latter is destroyed, as it frequently is, by the intense cold to which hunters are exposed in the pursuit of game.

The bark of the larch is nearly as valuable to the tanner as oak-bark; it also produces the substance called Venice Turpentine, which flows in abundance when the lower part of the trunk of old trees is wounded. A sort of manna, called Briançon Manna, exudes from its leaves in the form of a white flocculent substance, which finally becomes concreted into small lumps.

It is believed that this species was the *πίτυς* of the ancient Greeks. The origin of the more modern word *larix* is uncertain. By some it is derived from the Celtic *lar*, fat, in allusion to its unctuous, inflammable resin; by others from the Welsh *llär*, wide-spreading: it is, however, more likely to have been in some way connected with the word *l'aris*, which appears, from a very curious paper by Mr. Drummond Hay, read some time since to the Horticultural Society, to be the Berber name of a large coniferous tree, found in Rif, or Er rif, and in all the higher sierras of Morocco.

Sect. IV. Leaves growing in clusters; evergreen.—Cedars.

Abies Cedrus, the Cedar of Lebanon Fir. Mount Lebanon and the range of Taurus are the native spots of this most stately and magnificent tree, which compensates for its want of height by its huge wide-spreading arms, each of which is almost a tree in itself. According to Labillardière, a French traveller in Syria, the largest of those now remaining on Lebanon is, at least, 9 feet in diameter; the trees are held in great veneration. Its growth is far from being so slow as some have imagined; on the contrary, the observations of those who have cultivated it with care prove that it will vie in rapidity of growth with almost any forest tree.

Abies Deodara, the Sacred Indian Fir, a native of the mountains of India, in Rohilcund, and on the mountains of Nepaul and Tibet, at a height of 10,000 or 12,000 feet. It is a large tree, with a trunk about 4 feet in diameter, resembling the cedar of Lebanon, from which it differs in having its cones upon stalks, and its leaves longer and more distinctly three-sided, and also in the quality of its timber. According to Mr. Moorcroft, from whose notes, in Mr. Lambert's monograph of the genus, we borrow much of our information, the Hindoos call it the Devadara, or God Tree, and hold it in a sort of veneration. The wood is extremely durable, and so resinous that laths made of it are used for candles. Spars of it have been taken out of Indian temples, known to have been erected from 200 to 400 years, uninjured, except in those parts which originally were sap-wood. Mr. Moorcroft procured specimens from the starlings of a bridge in Ladakh, where it had been exposed to the water for nearly 400 years. Mr. Lambert says, that its wood takes an excellent polish, being very close-grained.

The genus of resinous plants called *Abies*, which we have thus described, comprehends many forest trees of great importance. Some of them,

such as the Larch, the Norway Spruce, the Silver Fir, and the Balm of Gilead, are raised in nurseries in the open ground, in large quantities, for the supply of our plantations; others, such as the Cedar of Lebanon and the Douglas Fir, are procured in much less abundance, and are treated with more care, being usually kept in pots until they are finally committed to the earth in the situation they may be subsequently destined to occupy.

A'BIES, in Fossil Botany, a name given by Adolphe Brongniart to a single incomplete specimen of a fruit resembling that of some spruce fir, but of which not even the locality is known. It is called *Abies laricioides*.

ABIETI'NEÆ. [CONIFERÆ.]

ABINGDON, a town in Berkshire, is pleasantly situated at the junction of the Ock and the Thames, just above where the Wilts and Berks canal joins the Thames, 51° 40′ N. lat., 1° 16′ W. long. The streets are most of them spacious, diverging from the market-place, and are paved and lighted; the supply of water is also good. The market-house is an elegant structure of freestone. Abingdon returns one member to Parliament. The population of the parliamentary borough in 1841 was 5502. There are two handsome churches, and meeting-houses for the Baptists, Independents, Quakers, and Wesleyan Methodists. There is a free grammar-school well endowed, founded in 1563, a National and a British school, and some other foundations for the purposes of education. There are also many almshouses. The trade of Abingdon consists of malting, hemp-dressing, and sack-cloth and sail-cloth making. The corn-market is large. Capacious wharfs and warehouses have been erected at the entrance of the Wilts and Berks canal into the Thames. Abingdon is 26 miles N.W. from Reading, and 56 W.N.W. from London. A branch railway from the Great Western Railway, at Didcot, to Oxford, passes by Abingdon, where there is a station.

ABJURATION OF THE REALM signifies a sworn banishment, or the taking of an oath to renounce and depart from the realm for ever. By the ancient common law of England, if a person guilty of any felony, excepting sacrilege, fled to a parish church or churchyard for sanctuary, he might, within forty days afterwards, go clothed in sackcloth before the coroner, confess the full particulars of his guilt, and take an oath to abjure the kingdom for ever, and not to return without the king's licence. Upon making his confession and taking this oath, he became attainted of the felony; he had forty days from the day of his appearance before the coroner to prepare for his departure, and the coroner assigned him such port as he chose for his embarkation, to which he was bound to repair immediately with a cross in his hand, and to embark with all convenient speed. If he did not go immediately out of the kingdom, or if he afterwards returned into England without licence, he was condemned to be hanged, unless he happened to be a clerk, in which case he was allowed the benefit of clergy. This practice, which has obvious marks of a religious origin, was, by several regulations in the reign of Henry VIII., in a great measure discontinued, and at length, by the statute 21 James I. c. 28, all privilege of sanctuary and abjuration consequent upon it were entirely abolished. In the reign of Queen Elizabeth, however, Roman Catholics and Protestant Dissenters convicted of having refused to attend the divine service of the Church of England, might by statute (35 Eliz. c. 2.) be required to *abjure the realm*, and if they refused to swear, or to depart, or returned to England without licence after their departure, they were to be adjudged felons, and to suffer death without benefit of clergy. Thus the punishment of abjuration inflicted by this Act of Parliament, was far more severe than abjuration for felony at the common law: in the latter case the felon had the benefit of clergy; in the former, it was expressly taken away. Protestant Dissenters are exempted from this severe enactment by the Toleration Act (1 Wm. III. c. 18); but Popish recusants convict were liable to be called upon to abjure the realm for their recusancy, until a statute, passed in the 31 Geo. III. c. 32 (1791), relieved them from that and many other penal restrictions, upon their taking the oaths of allegiance and abjuration. The form of the oath was altered by the Roman Catholic Relief Act, 10 Geo. IV. c. 7.

ABJURATION, OATH OF, is an oath which asserts the title of the present royal family to the crown of England. It is imposed by 13 Will. III. c. 6; 1 Geo. I. c. 13; and 6 Geo. III. c. 53. The taker of the oath (juror) recognizes the right of the king under the Act of Settlement, engages to support him to the utmost of the juror's power, promises to disclose all traitorous conspiracies against him, and disclaims any right to the crown of England by the descendants of the Pretender. The juror next declares that he rejects the opinion that princes excommunicated by the Pope may be deposed or murdered; that he does not believe that the Pope of Rome or any other foreign prince, prelate, or person, has or ought to have jurisdiction, directly or indirectly, within the realm. The form of oath taken by Roman Catholics who sit in either House of Parliament, is given in 10 Geo. IV. c. 7. (the Roman Catholic Relief Act). The first part of the oath is similar in substance to the form required under 6 Geo. III. c. 53. The following part of the oath is new:—'I do hereby disclaim, disavow, and solemnly abjure any intention to subvert the present Church Establishment as settled by law within this realm; and I do solemnly swear that I will never exercise any privilege to which I am or may become entitled to disturb or weaken the Protestant religion or Protestant government in the United Kingdom; and I do solemnly, in the presence of God, profess, testify and declare that I do make this declaration, and every part thereof, in the plain and ordinary sense of the words of this oath, without any evasion, equivocation, or mental reservation whatsoever.'

The word *Abjuratio* does not occur in classical Latin writers, and the verb *Abjurare*, which often occurs, signifies to deny a thing falsely upon oath.

ABLANCOURT, NICOLAS PERROT D', a

translator of Greek and Roman writers into the French language, was born at Châlons-sur-Marne, April 5, 1606, and died at his seat of Ablancourt, in Champagne, Nov. 17, 1664. Of D'Ablancourt's numerous translations those most known are—the whole of Tacitus, of which there have been ten editions; four orations of Cicero; Cæsar; the Wars of Alexander by Arrian, the most esteemed of his translations as regards the style only; Thucydides; the Anabasis of Xenophon; and an imitation, rather than a translation, of Lucian. The translations of D'Ablancourt are inaccurate and paraphrastic, and have long been superseded by others of more value.

ABLATIVE CASE. [DECLENSION.]

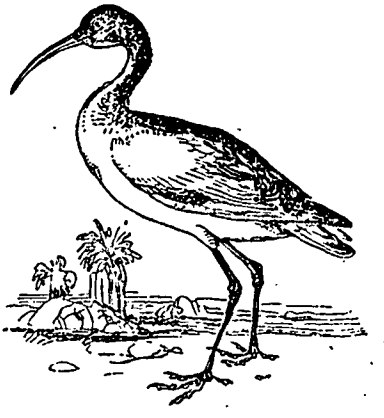
ABO, a town in Finland, is situated in 60° 27′ N. lat., 22° 17′ E. long. on both sides of the Aurajoki river, a short distance above its outfall into the Gulf of Bothnia. Abo formerly contained upwards of 14,000 inhabitants, had a flourishing commerce, considerable trade, and a well-attended university; but a fire which happened in 1827 destroyed 780 houses, together with the buildings of the university and its library of 40,000 volumes. The university was then removed to Helsingfors, which had been made the capital of Finland, after its acquisition by Russia, in 1809, instead of Abo, which was the capital while Finland belonged to Sweden. The university of Abo was at first an academy instituted by Gustavus Adolphus in 1628, and was raised to the rank of a university by Queen Christina in 1640. The town of Abo has been rebuilt with wide and regular streets, but the commerce of the port, the trade of the town, and the population, are all greatly diminished; its once celebrated observatory has been converted into a naval school, and its fine old castle on the heights above the entrance of the river is little more than a picturesque ruin.

ABORIGINES, a term by which we sometimes denote the primitive inhabitants of a country. Thus, to take one of the most striking instances, when the continent and islands of America were discovered, they were found to be inhabited by various races of people, of whose immigration into those regions we have no historical accounts. All the tribes, then, of North America may, for the present, be considered as aborigines. We can, indeed, since the discovery of America, trace the movements of various tribes from one part of the continent to another; and, in this point of view, when we compare the tribes *one with another*, we cannot call a tribe which has changed its place of abode, aboriginal, with reference to the new country which it has occupied. The North American tribes that have moved from the east side of the Mississippi to the west of that river are not *aborigines* in their new territories. But the *whole mass* of American Indians must, for the present, be considered as *aboriginal* with respect to the rest of the world. The English, French, Germans, and others who have settled in America, are, of course, not *aborigines* with reference to that continent, but settlers, or colonists.

If there is no reason to suppose that we can discover traces of any people who inhabited England prior to and different from those whom Julius Cæsar found here, then the Britons of Cæsar's time are the aborigines of this island.

The term aborigines first occurs in the Greek and Roman writers who treated of the earlier periods of Roman history.

ABOU-HANNES (*Ibis religiosa*, Cuvier; *Tantalus Æthiopicus*, Latham).



This bird, called Abou Hannes, or Father John, by the Arabs of Upper Egypt, and Abou-Menzel, or Father Sickle-Bill, in Lower Egypt, is no doubt the white or Sacred Ibis, described by Herodotus as 'being familiar with man, and having no feathers on the head and neck; white all over, except the head and neck, the tips of the wings, and the tail, which are very black.' (Herod., ii. 76.) In ancient times this bird was regarded by the Egyptians with great veneration; it was kept tame in their temples; it was delineated in their sculptures; it was embalmed after death, and mummies of it remain to the present day. The cause of this reverence is attributed by Herodotus to the destruction it annually made among serpents in those parts of Egypt; but the structure of the curved beak, long, slender, blunt at the edges, and roundish at the tip, does not appear to render it a very serviceable instrument for such work; and though Cuvier detected the skin and scales of a snake in the mummy of an Ibis which he examined, we doubt whether these reptiles form its habitual food. Indeed, M. Savigny ('L'Histoire Nat. et Mythol. de l'Ibis') found in the crops of the fresh killed specimens which he examined in Egypt, only land and fresh-water shells; and these, with worms and soft mollusks, we suspect, constitute its ordinary diet.

With more reason may we connect the reverence in which this bird was once held to its appearance in Egypt at the time of the annual rise of the Nile. Breeding, most probably, in the more central latitudes of Africa, the Abou Hannes visits Egypt in June, about the summer solstice, and continues during the increase of the waters till September: with the spread of the inundation its numbers increase, and they diminish as the waters subside. On their first arrival the birds repair to the low lands, over which the

water is beginning to flow; and as its depth and extent augment, they gradually retire to higher grounds, and spread themselves either singly or in small companies along the sides of canals and water-courses, intersecting the country; here they may be seen exploring the mud with the bill in quest of food, or sweeping on powerful wings and with a lofty flight from one spot to another, uttering at intervals hoarse loud cries.

Strabo notices this bird, the Sacred Ibis, as frequenting the coast to the east of the Straits of Bab-el-mandeb; and Mr. Salt, sailing from the south, after getting round Cape Guardafui, saw near the coast a lagune abounding in wildfowl, on the borders of which were numbers of these birds, the true Ibis of the Egyptians. The range of this species would therefore appear to extend from Egypt to the equator, and it is in these southern latitudes that it is supposed to breed; for it is essentially migratory in Egypt, and does not breed there, nor is its mode of nidification known. It is to Bruce that the recognition of this bird as the Sacred Ibis is due; and Cuvier, Savigny, Geoffroy, and other scientific men, have confirmed his opinion.—See an admirable article on the Ibis, in Cuvier's 'Theory of the Earth;' or in the Annales du Muséum' for 1804; and also 'Règne Animal.'

The Sacred Ibis is about the size of a fowl, but with longer legs, bare above the joint. When young, the neck is partially covered with blackish down, but this soon disappears, leaving the head and neck quite bare, and, as are also the beak and legs, of a decided black colour. The general plumage is white, with the exception of the tips of the quill feathers, which are of a glossy black, with violet reflections; as are also the last four secondaries, which have the barbs singularly elongated, so as to form a graceful pendant plume. This bird is the type of a family among the order Grallatores. [IBIS.]

ABOU-HARB, the Arabic name of the Leucoryx Antelope.

ABOU-HOSSEIN, the Arabic name of a species of Fox (*Canis pallidus*), found in Darfur and Kordofan. (Rüppel, *Zool. Atlas.*)

ABOU-SCHOM, the Arabic name of a species of Fox (*Canis variegatus*), found in Nubia and Upper Egypt. It does not burrow, but resides among rocks. (Rüppel, *Zool. Atlas*, p. 31.)

ABOUKIR. The castle of Aboukir is in 31° 20′ N. lat., 30° 5′ E. long., and about 13 miles N.E. of the town of Alexandria: it stands on the extreme north-eastern point of the low barrier of limestone rocks that form the breastwork of the coast of Alexandria. It marks, in fact, the extreme eastern limit, along the northern coast, of the rocks of the African continent, being immediately followed by the old Canopic mouth of the Nile and the alluvium of the Delta. The small island which lies near Aboukir Point bears evident marks of having once been larger than it is at present. This little spot is now commonly called Nelson's Island, in commemoration of the victory which the English admiral obtained over the French fleet, under Brueys, in Aboukir bay, August 1, 1798.

ABOUSAMBUL, IPSAMBUL, or EBSAMBUL, a place remarkable for containing two of the most perfect specimens of Egyptian rock-cut temples. These excavations are in Nubia, on the west side of the Nile, 22° 22′ N. lat., 31° 40′ E. long. Near Abousambul the river flows from S.W. to N.E., through sandstone hills; on the west bank a valley opens and displays two faces or walls of rock, each of which has been fashioned into the front of a temple. The excavations are made in the solid mass of the mountain.

The smaller temple stands 20 feet above the present level of the river, and is in a state almost as perfect as when it was just completed.

The façade of this excavation is the exact prototype of those masses of Egyptian architecture called *própyla:* the face slopes outwards towards the base, thus preserving one chief characteristic of the pyramidal style of building. On each side of the door-way are three standing colossal figures, about 30 feet high, cut out of the rock and deep sunk in niches, to the back part of which they are attached by a portion of the rock that has been allowed to remain. The figures are in a standing position, with one foot advanced, and looking towards the river. On each side of the larger figures stand smaller ones, from 4 to 6 feet high. The whole façade is ornamented with hieroglyphics, which, it is now ascertained, contain various repetitions of the name of Ramses, one of the several ancient monarchs of Egypt who bore that name.

The width of the front of this temple is about 90 feet, the depth 76 feet. From the door a passage leads to a room 35 feet by 36½, supported by six square pillars, three on each side, with Isis-headed capitals. From this apartment we pass into a narrow kind of vestibule, and thence into the adytum or recess, which contains the remains of a sitting statue cut in the rock. The interior of this excavation is richly adorned with painted bas-reliefs, representing offerings of palm branches and the lotus to Osiris, with other subjects usually found in the Egyptian sculptures.

But this excavation, magnificent as it is, sinks into insignificance when compared with another rock-cut temple, which is found a few hundred feet distant on the opposite side of the valley. The front of this temple was almost covered with sand, except the head and shoulders of one of the four colossi which decorate the façade, and the frieze and head of an enormous hawk. Belzoni, in the year 1817, succeeded in finding the entrance; but he had to remove 31 feet of sand before he came to the top of the door.

This excavation is about 100 feet above the level of the river. The width of the front is 117 feet (127 according to Colonel Stratton), and the height 86 feet: the height from the top of the door to the top of the cornice is 66 feet 6 inches; the height of the door is 20 feet. There are four enormous sitting colossi in front, which are the largest in all Egypt or Nubia.

The following are some of the dimensions of one of these enormous figures; 25 feet 4 inches across the shoulders, the face 7 feet long, the nose 2 feet

8 inches, the beard 5 feet 6 inches; the whole height, as it sits, is about 50 feet, besides the cap, which is 14 feet high. Only two of these monsters are in sight; the others are buried in the sand. Over the door there is a figure in relief of Osiris, 20 feet high, with two colossal figures, one on each side looking towards it. Above the cornice of the façade is a row of twenty-two monkeys seated, about 8 feet high, and 6 across the shoulders.

The depth of the temple is about 170 feet. It contains in all fourteen apartments; but its several arrangements may be best understood, by considering it as containing four principal chambers behind one another, with a number of attached apartments. The Pronáos, or first chamber, is 57 feet long, and 52 wide, and is supported by two rows of square pillars, four in each row, and 30 feet high. To each pillar is attached by his back a standing colossus, which, reaching to the roof with its high cap, appears to support the incumbent mass. The arms of these figures are crossed on the breast; in one hand they bear the key of the Nile, and in the other the scourge.

The painted walls represent a hero of colossal size gaining a victory over his enemies.

In the adytum, or last chamber of the four above-mentioned, which is 23½ feet long, and 12 wide, there are four colossal painted figures seated at the extremity: in the centre of this room is a pedestal. Heeren conjectures that a sarcophagus once stood on this pedestal, and that we ought to consider this huge excavation not a temple, but a tomb.

(*Egyptian Antiquities*, in *Library of Entertaining Knowledge.*)

ABRAHAM (originally ABRAM), the great ancestor and founder of the Jewish nation. He was born probably at Ur, a town of Chaldæa, about 2000 years before the Christian æra. His history occupies about a fourth part of the book of Genesis—namely, from the 11th to the 25th chapters inclusive. He died at the age of 175, and was buried in the same tomb which contained his first wife, Sarah, in Mamre.

ABRANTES, a fortified town of Portugal, in the province of Estremadura, on a hill near the Tagus, 39° 30′ N. lat., 8° 10′ W. long., 74 miles north-east of Lisbon. Abrantes is an important military position, and gave the title of Duke of Abrantes to Marshal Junot. [ESTREMADURA.]

ABRAZITE. [PHILLIPSITE.]

ABRUZZO, a name given to three of the divisions of the kingdom of Naples, in Italy. The three Abruzzi are contiguous to each other, and are bounded on the N.W. and W. and S.W. by the Papal States, on the N.E. by the Adriatic Sea, on the S.E. by Sannio, and on the S. by the Terra di Lavoro. The entire area is about 5070 square miles, and the entire population about 788,000. The *Abruzzo Ultra I.*, *Abruzzo Ultra II.*, and *Abruzzo Citra* (that is, Farther Abruzzo I., Farther Abruzzo II., and Nearer Abruzzo), are so called from their relative position with regard to the capital city, Naples.

Abruzzo Ultra I. contains about 1140 square miles and 200,000 inhabitants. It is also called *Provincia di Teramo*, from Teramo, the principal town of the province. The province is divided into two administrative districts, Teramo and Penne. The town of Teramo is a bishop's see, and contains several churches and convents, and about 8000 inhabitants. Penne, or Cività di Penne, is a town with about 6000 inhabitants. Civitella del Fronto is a small fortified town. Atri is a bishop's see, has a cathedral, and contains about 5000 inhabitants.

Abruzzo Ultra II. contains about 2220 square miles, and 290,000 inhabitants. It is also called the *Provincia di Aquila*, from the chief town, Aquila, which is situated on a hill on the banks of the Pescara: it has a castle, manufactures of paper, stockings, leather, and a population of about 10,000. Sulmonas, the ancient Sulmo, and Celano, about four miles from the Lake of Celano, belong to this province.

Abruzzo Citra contains about 1700 square miles, and 298,000 inhabitants. It is also called the *Provincia di Chieti*, from Chieti or Teti, the ancient Teate, near the Pescara, which has above 12,000 inhabitants. This city is one of the finest in all Abruzzo, is well-built, and a place of considerable wealth and luxury. The fortress of Pescara and the towns of Ortona on the sea, and Lanciano on the Foltrino, belong to this division of the Abruzzi.

The provinces of the Abruzzi present to the Adriatic a coast about eighty miles in length, with hardly an indenture or projection that deserves notice, except the point called Penna, and not a single harbour for moderate-sized vessels.

The mountains of the Abruzzi, though forming an essential part of the Apennine chain, and therefore running generally from N.W. to S.E., are extremely irregular. They send out smaller branches towards the coast of the Adriatic, forming beds for the numerous streams which flow into that gulf. In the centre they form several high ridges, sometimes diverging from and sometimes parallel to each other; the valley of Aquila lies between Monte Corno and Monte Velino; and between the latter and a more southern ridge lies the basin of the lake Celano. This lake, the Fucinus of the Romans, is only a short distance from Capistrello: its greatest length is about 15 miles, with a breadth averaging about 5 or 6. It is said to contain many fish. The Emperor Claudius undertook a great work for the purpose of draining the lake, or at least preventing it from doing damage by overflowing. Claudius made a canal 3 miles long, partly by perforating and partly by cutting down a mountain. It was finished in eleven years, 30,000 men having been constantly employed thereon.

The valleys of the Abruzzi to the west of the lake Celano are watered by the Liris, the Turano, and the Salto, which two last join the Velino. The real back-bone of the Apennines, by which we mean the line which divides the waters that flow eastward from those which run westward or southward, may be traced between the sources of the latter river and those of the Tronto, which flows into the Adriatic. Following it to the south we find the sources of the Pescara, which

also runs into the Adriatic; and we trace the main chain farther south, on the east side of the basin which contains the Lake of Celano. The Central Apennines, to the north and east of Lake Celano, contain the highest points in the whole range. Monte Velino is seen from the eminence of Albi to the north, raising its lofty head 8397 feet. Farther north, Monte Corno, the highest point of the Apennines, sometimes called the Great Rock of Italy (*il Gran Sasso d' Italia*), rises to the height of 9521 feet, and its summit is covered with snow, sometimes perhaps through the whole year. Vegetation however ceases only 600 feet below its highest point. Another lofty mountain, called Monte Majella, projects out of the main ridge between the valley of the Pescara and that of the Sangro, to the N.E. of the Sulmona, its highest summit being 8500 feet. This is an extinct volcano. The mountains of Abruzzo are among the finest in the whole Apennine range. They are less naked than those farther north, and they present groups of a bolder and more romantic appearance. Spreading over a vast extent of country, 50 or 60 miles in breadth, they enclose delightful valleys, towns, and a numerous population within their various ridges: the whole province of Aquila is, in fact, encircled by them. These mountains are calcareous, like the great mass of the Apennines.

The natives of the highlands of Abruzzo are chiefly employed in rearing and tending sheep, numerous flocks of which, after feeding on the mountain pastures during summer, migrate to the plains of Puglia at the approach of winter. The shepherds are generally accompanied by their wives and children in these yearly migrations to and from the mountains, and by their large white dogs, which are very fierce to strangers. The sheep's milk is used to make cheese, the wool is an important article of trade, and the skins are exported in great quantities to the Levant. The shepherds also are clothed in them, and wear sandals of untanned leather, fastened with small cords, round the leg: they are a quiet, frugal, and honest race. The breed of merino sheep has been introduced into the Abruzzi. The labourers and farmers in the Abruzzi are mostly poor, few of the latter being proprietors. Numerous herds of swine are fed in the extensive oak forests that cover the mountain sides.

The lower parts of the Abruzzi have a productive soil, and export a considerable amount of grain, oil, and almonds: they also produce some cotton. Of the three provinces that of Aquila is the most mountainous and the poorest; its territory produces excellent saffron. The province of Teramo is fruitful in rice and corn. That of Chieti is the most fertile of all, and its wines are much esteemed. The olive grows in both the latter provinces. Abruzzo is, upon the whole, a very important as well as very interesting division of the Neapolitan States, of which it constitutes the chief defence on the land side. The possession of the Abruzzi has always tended materially to decide the fate of Naples.

Albanian and Greek colonies are found scattered about the Abruzzi, as well as in the other eastern provinces of the kingdom of Naples. They occupy whole villages with the districts around them, and form so many distinct populations in the midst of the indigenous inhabitants, preserving the manners, the language, and partially the dress of their ancestors.

(Balbi, *Géographie*; Tenore, *Viaggio in Abruzzo;* Sir R. C. Hoare's *Classical Tour.*)

ABSCESS (from a Latin word, *Abscedo*, implying separation), is so called, because parts which were in contact have become separated. An abscess consists of a collection of the matter termed pus, in some tissue or organ of the body. Purulent matter, or pus, is formed out of the blood by the process termed secretion. Of the intimate nature of this process, as of that of all the other secretions, we are ignorant. What is certain is, that the formation of pus is never a healthy process, and never an original disease. It is always the result of another disease,—namely, inflammation; or, if there be any exceptions, they are so few that they need not be taken into account here. The process consequent on an inflammation, by which pus is secreted, is termed the process of Suppuration. [INFLAMMATION.]

ABSCISSA. [COORDINATES.]

ABSENTEE. This is the first subject, in alphabetical order, that comes under our notice in the science of political economy. In the whole compass of that science there is no subject which presents more difficulties in the way of popular explanation, if we view it purely as a scientific question. An absentee, as the term is now used, is a person who derives his income from one country, but resides in another country where he expends that income. The common voice of mankind says that this is an evil and an injustice. It points to lands imperfectly cultivated, to labourers inadequately employed, to ruined cottages, to uneducated children, and it proclaims that these things would not be if the proprietor resided upon his estates. He does not choose to reside upon his estates; he would rather derive less from his estates, having the liberty to spend the revenue as he pleases. There is no law to prevent him but the great law of moral obligation, which he may obey or not. The public inconveniences of a positive law to bind his person to his property would far outweigh its public good. But the common sense of mankind is right; and the day of retribution comes when neglect goes forward into general destitution. Then the capital which has been abstracted from its fertilizing local influence is forcibly driven back, to prevent misery becoming utter ruin. Such results are shown in large districts of Ireland at the present day. The political economists of every class cannot shut their eyes to these facts; but some say that these facts lie beyond the boundaries of their science; they belong to the moralist to explain. They consent only to look at the absentee in his abstract capacity of a capitalist; they admit that it would be better for his own local connections and dependants that he should not be an absentee; but they are prepared to prove that it is a matter of indifference to the country in general; that the wealth of the country is neither increased nor diminished whether he spend his rents in Dub-

lin or in London—in London or in Rome. Even in this point of view these economists have few supporters. Popular opinion, without pointing to the extreme moral evils of a non-resident landed proprietary, maintains that the amount of revenue which the landlord spends in a foreign country is so much clear loss to the country from which he derives his property, and so much encouragement withdrawn from its industry; and that he ought therefore to be compelled to stay at home, instead of draining his native land for the support of foreign rivals. Some political economists reply, that this is a popular delusion, and that, in point of fact, the revenue spent by the landlord in a foreign country has precisely the same effect upon the industry of his own country as if his consumption took place at home. The truth perhaps lies between these counter opinions. The argument of the economists runs thus: all consumers residing in their own country, and landlords amongst the number, purchase many articles of foreign production which have been exchanged for the productions of their own country. In purchasing such foreign productions they stimulate native industry; in taking from foreigners what they produce cheaper and better than we can, and in sending them in exchange what we can produce cheaper and better than they can, we develop a wider field of industry for our native productions, and obtain a larger store of commodities for our home necessities. The consumption of an English resident in a foreign state, they go on to say, produces, in principle, the same indirect effects upon English industry, as his partial or entire consumption of foreign goods in England. His consumption of foreign goods abroad is equivalent to an importation of foreign goods into England; and that consumption, it is said, produces a correspondent exportation of English goods to the foreigner. For why? There must be an export of English goods to some country to the amount of the foreign goods which he consumes, otherwise his remittances could not be made to him. For example, England owes half a year's rent to the resident at Brussels; he draws a bill upon England, which a banker discounts, and sells to a merchant at Antwerp, who wants the bill to pay for goods which Antwerp owes to England; and so, say the economists, England keeps the rent after all; and it stimulates industry as much as if it had been spent in England at first. It does little, they say, to stimulate industry in either case, for it is equally unproductive consumption. It has been a notion amongst a class of political economists, which is fast yielding to sounder notions, that all expenditure is unproductive unless it be incurred *directly* in the aid of further production. The truth is becoming apparent, that it is impossible to limit productive expenditure by such narrow laws—to say that the man who spends 100*l.* in clothes is an unproductive consumer, whilst the tailor who spends 50*l.* in cloth and labour for the clothes is a productive consumer. The one could not exist without the other. The one has enabled the other to make a profit upon the clothes, and part of that profit may become accumulation as certainly as if the buyer of clothes had been satisfied with half his wardrobe [CAPITAL]; and this shows the fallacy that lies at the bottom of the absentee argument. The absentee withdraws the local *profit* of those who have a natural claim to supply his wants. It may be true, that the foreigner requires some additional goods from England in consequence of the domiciliation of the English absentee; but does he require as large an amount of English goods as the total sum which the Englishman expends? Unquestionably not. There are large differences between the exchanges of commerce and the smaller exchanges of domestic life. The profit of the foreign retailers, of the foreign domestic servants, of the foreign landlord of the absentee's house, remain at any rate to the foreign country, and are so much abstracted from the absentee's country. By abstracting the profit of these smaller transactions, the surplus that becomes accumulation remains in the shape of new capital to the foreign country. New capital in a country is created by the slow aggregation of minute individual profit. Profit is like the nitrogenous substances in the food of men. Individuals may exist feebly and miserably without profit from their labour—that is, their labour may replace what they consume, and leave no surplus—as individuals may drag on existence upon the innutritious root which imperfectly replaces their ordinary exhaustion, and leaves nothing for development or extraordinary exertion. But the wealth of nations cannot be sustained without surplus produce—without profit; as the health of communities cannot be sustained without the food which builds up the body as well as keeps alive the animal heat. Rent is really profit under another name. It is, in most cases, the largest portion of the surplus produce of the soil. It is that surplus which constitutes a natural fund for social improvement. The absentee who withdraws that fund from its local appropriation to make it the source of new profit to a foreign country, even if it be only the profit of supplying his domestic necessities, and not the profit of commercial exchange, to a certain extent must take away what he ought to contribute to the accumulation of his own district and his own country.

(The arguments which deny the injurious effects of absenteeism, merely regarded as a question of political economy, may be seen in Mr. M'Culloch's evidence before the Select Committee on the *State of Ireland*, 1825, *Fourth Report*, and his evidence before the Committee on the State of the Poor in Ireland, 1830. The contrary argument may be found in *Lectures on Political Economy* by J. A. Lawson, LL.B., Lecture V. 1843.)

ABSOLUTION, a religious ceremony by which the Christian priest declares an individual, on repentance and submission to the requisite penance, to be absolved either from his sin, or from the ecclesiastical punishment to which it had rendered him liable. Since the twelfth century, the formula used in the Roman Catholic Church has been 'Ego te absolvo a peccatis tuis' (I absolve thee from thy sins), accompanied with the sign of the cross. The Council of Trent has expressly condemned the doctrine that the priest has not

power of himself to absolve from the guilt of sin. (Session xiv. Canon 4.) The Church of England also holds, as may be seen in the Order for the Visitation of the Sick, that power has been left to the church to absolve repentant sinners; and the words which the minister uses in performing the ceremony are nearly the same with those employed in the Catholic communion, 'I absolve thee from thy sins.' In the Protestant Church of Scotland, the term Absolution is commonly used to denote simply the declaration of the Kirk-Session or other judicatory, expressed by the mouth of its president, that the party is released from the ecclesiastical interdict to which his delinquency had subjected him.

ABSORPTION, from *absorbeo*, to suck up. The function of absorption is one of the most curious and important of the animal economy. The matter of which the living body is composed is in a state of continual change; old particles are every moment taken from their situation and carried out of the system; new particles are every moment conveyed to the place occupied by the old, and deposited in their room. The constituent matter of the living body is, therefore, never exactly the same in two successive moments. This change of the constituent matter of the living body is effected by the process termed absorption; and the agents by which this process is carried on are the absorbent vessels. The absorbent vessels possess a peculiar structure essentially different from that of arteries, veins, or any other vessels of the body, and their action likewise is altogether peculiar. The absorbent vessels consist of two distinct sets. The first arise from the alimentary canal, and more especially from the small intestines. They absorb the digested aliment, and are the instruments by which the new particles of matter, which are necessary to supply the loss occasioned by the removal of the old, are carried into the system. This new matter, which is termed chyle, is of a white colour, very much resembling milk; and these vessels, when full of it, have the appearance of minute tubes distended with a milky fluid; hence they are called lacteal vessels (that is, milk-vessels). The other set arise from every part of the body; from the whole of its external surface, from the whole of its internal surface, from every one of its tissues, from every one of its organs; so that the point of the finest needle can touch no part of the body without coming into contact with a branch of this system of vessels. At every point of the body these vessels are always at work, taking up and carrying away the old and worn-out particles. But, further, those which are spread out on the external skin, and those also which are spread out on the internal skin—on the membrane which lines the air-passages, for example, and on that which lines the passage to the stomach—are capable of taking up many foreign substances which may come into contact with them, and often powerfully affect the system by introducing into it these foreign bodies. Whatever be the nature of the substance contained in this second set of vessels, and from whatever source it be derived, it is always without colour when received into the vessel, and perfectly transparent and pellucid; on this account it is termed lymph, and these vessels are, therefore, called lymphatics. The lacteals then contain new matter derived from the digested aliment; the lymphatics contain the old and worn-out particles of the system, together with whatever substances may have been taken into it from the surfaces of the body.

The function of absorption explains many phenomena connected with health, with disease, and with the action of remedies. The agents which produce disease, and especially the widely-extended and powerful causes of fever, namely, animal and vegetable matter in a state of decomposition; these, together with the effluvia of marshes, exhalations from the animal body itself, and perhaps other noxious gases diffused in the atmosphere, afford striking illustrations of its operation. An exposure but for a few minutes to an atmosphere loaded with marsh effluvia of an intensely noxious nature, may produce a protracted ague, or even instantaneous death. Even a few inspirations of an atmosphere rendered foul by exhalations from the human body may produce, in a person previously healthy, immediate nausea and vomiting, followed by severe and pernicious fever. A person labouring under small-pox may contaminate the air of a room to such a degree, that a healthy person breathing this air but for a short space of time may become affected with the disease, although the infected may never have come into actual contact with the infecting person. In all these cases a poison is diffused through the atmosphere, which comes into contact with the surfaces of the body, and so affects the system through the medium of absorption. The free dilution of this poison with pure air will destroy, or render innoxious, these malignant agents; hence, persons who are under the necessity of remaining constantly in the chambers of the sick, may remain there with perfect impunity if these chambers are frequently and thoroughly ventilated; while, if ventilation be neglected, or imperfectly performed, not only is the disease of the patient aggravated, and perhaps by this cause alone rendered mortal, but his nurse also is sure to suffer. Hence the value of this further fact, which cannot be too constantly borne in mind, that these noxious agents always affect the system exactly in proportion to its want of energy. Exposure to a powerful noxious agent, when the stomach is empty, when the body is exhausted by fatigue, when the mind is depressed and desponding, will occasion a mortal disease; exposure to this very same agent, when the body is well nourished, when the functions are carried on with vigour, when the mind is cheerful and confident, will be attended with no appreciable effect. There is no kind or degree of sickness with which a family or an individual can be affected, in the management of which the knowledge of facts of this kind may not afford useful suggestions; but this knowledge is of paramount importance when malignant and mortal epidemics attack a village, a city, a district, or a nation.

ABSORPTION OF LIGHT is that quality in an imperfectly transparent body, or of a po-

lished surface, by which some portion of an incident pencil of light is retained within the body, while the rest is either transmitted through it, or reflected from it.

It may reasonably be assumed that, in a homogeneous medium, indefinitely thin laminæ of equal depths will absorb quantities of light bearing nearly a constant ratio to those which enter them; and hence it is probable that, in such media, the intensities of light form a decreasing geometrical progression at depths from the surface of incidence, which are in an increasing arithmetical progression. But it appears that some transparent media allow the rays of certain colours in an incident pencil of compound light to pass through them more freely than others; for example, the rays transmitted through glass, which, of a certain thickness, is yellow, appear, as the plate is successively thicker, to be green, brown, and red.

When a pencil of common light passes through a plate of tourmaline, or other doubly refracting crystal, the surface of the plate being parallel to the geometrical axis of the natural prism, the *ordinary ray*, which is polarized in a plane parallel to the axis, is almost wholly absorbed, while the *extraordinary ray*, which is oppositely polarized, is absorbed but in a small degree. The absorption of the ordinary ray is found, however, to take place gradually as that ray passes through the plate; for if the plate be cut in the form of an acute wedge, having its edge parallel to the axis of the crystal, on looking through it at a candle, it will be found that, near the edge, the two images are equally bright, while, on bringing gradually the thicker part of the wedge between the eye and the candle, the ordinary image becomes as gradually fainter, and at length disappears, the extraordinary image at the same time acquiring greater degrees of brightness.

The light falling at particular angles of incidence on the oxydated surfaces of metals, becomes polarized on being reflected from thence; and to the absorption caused by the light being polarized in the plane of reflexion, or perpendicularly to it, Sir David Brewster ascribes the blue colour of the common light reflected successively between two plates of indigo-coloured steel, and the yellow tint of that which has been reflected from steel of a straw colour; the red rays having been absorbed in one case, and the blue rays in the other. The same philosopher has also ascertained, that the proportions of different coloured rays which are absorbed in certain media, depend on the temperature of the media. In general, the tints gradually increase in intensity by the application of heat, and return to their original state when the body is cooled.

Bodies which absorb light become heated by the absorption; and, with a given quantity of light, the temperature of a body appears to be nearly proportional to its absorbing power.

ABSTINENCE, from *abstineo*, to abstain. The term abstinence signifies a total or an excessive privation of food. It has been shown [ABSORPTION] that the constituent matter of the body is in a state of continual change—that old particles are constantly taken up and carried out of the system, while new particles are as regularly deposited in their room to repair the loss. The source of these new particles is the aliment or food; but a second office is performed by the aliment scarcely less important than that of furnishing new matter for the renovation of the system. All the organs of the body are excited to the performance of their functions by certain external agents, which are called stimulants; such as air, water, heat, and so on; but of these stimulants the aliment is among the most indispensable and the most powerful. Upon the quantity and quality of the aliment depend the quantity and quality of the blood, and upon the quantity and quality of the blood depends in a great measure the energy of all the functions of all the organs. Any material change in the diet must necessarily produce a powerful impression on the system. Life can be maintained only for a short period under the total privation of food, while the excessive privation of it produces effects upon the system which have not been often observed with accuracy, but which are remarkably uniform, and highly curious and instructive.

During the first two or three days after the total abstinence from food, in a person previously in sound health, the suffering from hunger is generally severe. The thirst is also at times distressing, but thirst is not constantly attendant. The pulse during this period remains natural, and so does the temperature of the body. All the evacuations are scanty, and take place at distant intervals. After the first two or three days the wasting of the body becomes visible, the fresh colour characteristic of health disappears, and the features and the limbs, instead of being plump and round, are sunk and collapsed. The loss of weight, which increases rapidly, is appreciable, and the progress of the emaciation is striking. The physical debility increases in exact proportion with the emaciation; and the mind becomes weak, confused, wandering, irritable, and at length almost deprived of reason. All this time there is little or no pain from hunger or thirst, or these uneasy sensations return only at intervals, and are seldom acute and never lasting. The pulse at this stage may be a little quickened; it is certainly easily excited; and in like manner the heat, which seldom sinks below the natural standard, is readily parted with, so that a slight change of the temperature of a room is felt acutely, and produces very uneasy sensations—a fact which demonstrates to the physician the feebleness with which the functions are carried on, no less clearly than the physical debility itself. The most remarkable and curious phenomena which next supervene, are those connected with the intellectual faculties. The loss of power to perceive accurately, and to connect the trains of thought, is followed by decided delirium, which is at first of a low muttering character, similar to that which takes place in the last stage of typhus fever; but this sometimes passes rapidly into furious and even maniacal delirium, requiring coercion just as a violent paroxysm of madness itself. Generally the delirium is preceded by a state of painful watchfulness and

restlessness, it being impossible to procure sleep or quiet; and, finally, the skin becomes intensely hot, the pulse extremely rapid, the emaciation frightful, the debility so great that scarcely the slightest movement can be performed, and at length the individual sinks exhausted, commonly into a state of stupor amounting to that complete and profound insensibility which is technically called Coma.

From the powerful influence of abstinence on the system, it is capable of becoming a most energetic remedy in various diseases. When the mass of the fluids and solids of the body is too abundant, abstinence is capable of reducing them to almost any extent that can be required; and if the abstinence be judiciously commenced and conducted, not only is it unattended with any diminution of the strength or injury to the health, but it contributes to the improvement of both. Numerous instances are on record which place this fact beyond question.

In all acute diseases, such as the various forms of fever and inflammation, abstinence is a most powerful remedy, not only because the abstraction of nutriment diminishes the mass of the fluids and solids (since the process of absorption goes on though the supply of new matter is stopped), but also because it withdraws one of the main stimulants of the system, and consequently subdues the increased actions which accompany and for the most part constitute acute diseases.

In some chronic maladies, especially in that large class which depend on what is termed plethora, that is, too great a quantity of solids and fluids, particularly in the plethoric state of the blood-vessels of the brain predisposing to and producing apoplexy, in some morbid affections of the stomach itself, in some derangements of the liver, and in several diseases of the heart, abstinence is an invaluable remedy. In other chronic diseases it is injurious, as in diseases of debility, in diseases which depend on irritation in contradistinction to those which depend on inflammation, and in various nervous maladies.

It is curious, and it is highly important to bear in mind, that abstinence and excess produce symptoms so nearly alike, that it often requires the utmost care and sagacity on the part of the physician to distinguish the one case from the other; and as the one requires opposite remedies from the other, a mistake may be fatal, and must be injurious.

It is the common belief that abstinence is conducive to longevity, and many stories are on record which are conceived to establish the truth of this opinion. It is stated, for example, that the primitive Christians of the east, who retired from persecution into the deserts of Arabia and Egypt, lived healthfully and cheerfully on twelve ounces of bread per day, with mere water; that, with this diet St. Anthony lived 105 years; James the Hermit, 104; Arsenius, tutor of the Emperor Arcadius, 120; St. Epiphanius, 115; Simeon the Stylite, 112; and Romauld, 120: to which are added many others. But we should remark that the evidence for these instances of longevity may not be quite satisfactory.

ABSTRACTION is an act of the mind, by which it considers a certain attribute of an object, or several objects, by itself, and without regarding any other attributes which the object or objects may happen to possess. Thus, if we see ink, pitch, ebony, and a negro, we see that these objects have in common the attribute of blackness; and this quality we can in thought *draw off* or *abstract* from the various other attributes which they respectively possess; and consider it separately and independently of anything else. In like manner we can consider any attribute of a single object, such as of the sun or moon, without attending to its other attributes; thus we may contemplate the magnitude of the sun without attending to its heat, light, &c.: so we may contemplate the light of the moon, without attending to its magnitude, the inequalities of its surface, &c. All names of classes, inasmuch as the individual members can never be identical, are formed by a process of abstraction. Thus, when we think of a ship or a house, we pay no attention to the materials, colour, shape, size, construction, convenience, or beauty of the ship or house, but we give the one name to any dwelling of man built by regular artificers, and the other to any vessel with a deck and masts made to sail on the sea. Any object which possesses these attributes we call a ship or a house; though there cannot be any ship or house which possesses *only* those attributes, and is not also of a certain colour, size, shape, &c.; but these incidental qualities we leave out of our consideration in referring any object to the class of houses or ships.

From these remarks it is evident that abstraction, being a merely arbitrary act of the mind, by which a certain attribute is considered apart from any other attributes with which it may happen to be associated, does not represent to us images or notions to which there is anything corresponding in the nature of things: there is nowhere an abstract man or tree, which has no colour, dimensions, or other incidents not entering into the abstract notion signified by those general terms. Whenever we recognize in any object those peculiarities which we consider as characteristic of a certain class, we refer it to that class, *without* taking any heed of the other attributes with which they may happen to be combined.

The circumstance of there not being any sensible object, or any conception of our mind, which we can image to ourselves without its attributes, has given rise to considerable perplexity on the subject of abstraction. For instance, when we think of a horse, we represent to ourselves an animal of a certain colour, shape, and size; though we should equally give the name of horse to an animal of different colour, shape, and size. So, when we think of a plane triangle, although a triangle is any plane figure bounded by three straight lines, yet we cannot help representing to ourselves a triangle which is either right-angled, or acute-angled, or obtuse-angled, or equilateral, or scalene. The truth is, that the process by which the mind abstracts is, that it conceives or represents to itself the object of thought as an individual of its class, together with certain particular

attributes which must belong to all individuals; and it considers apart from the rest only that attribute which is required for the matter in hand. Thus, if it is a question whether a newly discovered skeleton is that of an animal belonging to the class of elephants or of deer, the comparative anatomist calls to his mind an elephant or deer, such as actually exists, but considers only the structure of his bones; and, if there is a close agreement in this respect, he pronounces the skeleton to have belonged to one of those classes. So, likewise, when a mathematician, by means of a figure described on paper, proves that the square on the hypothenuse equals the sum of the squares on the other sides of a right-angled triangle, although the image in his mind is that of a triangle of a definite size, yet he considers only the relation of the sides and angles, without paying any attention to the length of the sides.

ABSTRACTION AND ABSORPTION OF HEAT is that power by which caloric, or heat, proceeding from any body is received in the medium which surrounds the body, or in any conducting substance with which it is in contact, the temperature of the medium or of the substance in contact being lower than that of the body from which either of them receives the heat. The freedom with which the heat is propagated in the body receiving it is designated the conducting power of that body.

The heat emitted by bodies depends in part on the nature of their surfaces; such as have a certain degree of roughness allow it to pass off more abundantly than those which are smooth, and thus boiling water soon becomes cool if poured in a vessel whose exterior is painted or blackened, while it long retains its heat when it is contained in one whose exterior is polished. The conducting power differs, however, in different substances independently of the nature of the surface; among metals, that which possesses it in the highest degree, according to the experiments of Despretz, is gold; and below this, in order, are silver, copper, brass, platinum, iron, tin, zinc, and lead. Of solid bodies, the worst conductors are stones, earthenware, and glass; and Count Rumford has found by experiment that lint, sheeps' wool, raw silk, beavers' fur, and hares' fur, are successively lower than each other in conducting power.

Liquids are very imperfect conductors, yet, in consequence of the readiness with which their particles are displaced, heat rapidly passes through them: on mixing with water any substance, such as milk, which is capable of diminishing its fluidity, the velocity with which heat is propagated through it becomes less. Aeriform fluids are more imperfect conductors of heat than liquids, and still more so than solids, though heat is readily transmitted through them. Sir John Leslie proved by experiments that the surfaces from which heat radiates with the greatest freedom absorb it most readily; and Dr. Ritchie contrived a species of thermometer, by which he determined that the power of radiation from any surface is exactly equal to that of absorption from the same surface.

(*Journal of the Royal Institution*, Dec. 1831.)

ABSURDUM, REDUCTIO AD, is that species of argument which proves not the thing asserted, but the absurdity of everything which contradicts it. It is much used in Geometry, in order to demonstrate the converse [CONVERSE] of a proposition already proved. One of two things must be true; either the proposition asserted, or something which contradicts it. If the opposing party denies the proposition, he must affirm that which is contradictory. Let his counter-proposition be taken for granted: then, if, by the legitimate use of it, some absurdity can be deduced, it is evident that his contradiction is wrong, and the original proposition right.

The *reductio ad absurdum* has been objected to as not equally conclusive with direct demonstration. For this there is no foundation; though it must be admitted that direct demonstrations, are more pleasing and more elegant. But it is obvious that, if everything which contradicts a proposition be false, the proposition itself must be true.

ABU BEKR, son of Abú-l-Kahafah, of the illustrious tribe of Koraysh, was born A. D. 571. His original name was Abdu-l-Ka'bah, but he assumed the name of Abu Bekr ('father of the virgin,') on the marriage of his daughter Ayesha to the prophet Mohammed. On the death of Mohammed, in 632, two powerful parties claimed the right of appointing his successor, one espousing the cause of Abu Bekr, the father-in-law, the other that of Ali, the son-in-law of the prophet. Through the interposition of Omar, Abu Bekr was elected Khalif on the 9th of June, 632, though not without great opposition on the part of Ali. This contest divided the Mohammedan community into two sects, Sunnites and Shiites, which still subsist: the former assert the right of Abu Bekr and his two successors, Omar and Othman, to the command of the Faithful; while the latter condemn these three as usurpers, and maintain the exclusive right of Ali and his lineal descendants. [ALI IBN ABI TALIB.] For the newly elected Khalif only the towns Mecca, Medina, and Tayef declared themselves; the other Arabian provinces had renounced the religion of Mohammed, and now refused allegiance to his successor. The first care of Abu Bekr, accordingly, was directed to reduce the rebellious provinces to obedience, in effecting which he was powerfully assisted by Omar, who afterwards succeeded him, and by Khaled Ibn Waeld, a general of extraordinary ability. Having suppressed this rebellion, Abu Bekr was assailed by other difficulties from several new pretended prophets, who started up in different parts of Arabia, and gathered numerous adherents around them. The most formidable of these was Moseylemah, who had risen in the province of Yemamah. He was defeated by Khaled, and slain in a battle near Akrabah, in which also many of the personal associates of Mohammed fell. After this battle Abu Bekr caused the precepts and ordinances of Mohammed, which had hitherto been partly oral and partly written on palm-leaves, to be collected, and the whole to be embodied in the volume known under the name of the Koran.

Having fully established his authority over

Arabia, Abu Bekr's next aim was to extend the limits of the empire. For this purpose he despatched Khaled into Irak, who subdued several of the frontier provinces of Persia. He was soon recalled, however, to join Abu Obeiah, who had been sent against Syria, had defeated the army of the emperor Heraclius, and taken Bostra. With united forces the two generals defeated a Greek army of 70,000 men, and completed the conquest of Syria by the capture of Damascus, Aug. 23, 634.

On this same day Abu Bekr died at Medina, in the 63rd year of his age, having appointed Omar as his successor in his will. He is greatly extolled by Eastern writers for the simplicity of his habits, and the piety of his life; so great was his liberality, that on Friday in each week he distributed what remained of his own and the public money among the poor. Even the partisans of Ali, who consider him a usurper, acknowledge him to have been the mildest monarch who ever wielded a sceptre.

(Abú-l-fedá, *De Vita et Reb. Gest. Mohammedis*, Oxon. 1723; Gibbon, *Decline and Fall.*)

ABULFARA'GIUS, properly *Mar Gregorius Abulfaraj*, an Oriental writer of much celebrity, was born in A. D. 1226, at Malatia, a town near the sources of the Euphrates, in Armenia, where his father, Aaron, followed the profession of a physician. Though the offspring of a Jewish family, he embraced the Christian belief, to which he continued faithful till his death. Abulfaraj studied theology, philosophy, and medicine. He spent the greater part of his life in Syria. He was made a bishop at the age of twenty, and for some time held the see of Aleppo. In 1266 he was elected primate of all the Jacobite Christians in the East. He died at Maragha in Azerbijan, A. D. 1286.

Abulfaraj was the author of a great number of Arabic and Syriac works; but the composition through which his name has become best known is an abridgment of general history, entitled 'The History of the Dynasties.' The work, which was written by the author both in Arabic and Syriac, is divided into ten parts or dynasties, and contains a history of the world from the creation to his own time. The parts relating to the Mogul Tartars, the conquests of Genghiz Khan in Syria and Mesopotamia, and the Mohammedan history, are of very great value. The Arabic text of 'The Dynastics,' with a Latin translation, was published by Pococke, at Oxford, in 1663, 4to.; the Syriac text, likewise with a Latin version, by Bruns and Kirsch, at Leipzig, in 1789, 4to.

ABU-L-FAZL, vizier of the Mogul emperor Akbar, who reigned from 1555 to 1605, was born at Agra, in what year is uncertain. Of the life of Abu-l-Fazl few details are known to us. He was called to the council by Akbar in 1572. In 1602, when returning from the Deccan, he was murdered in the district of Nurwar, by the contrivance of Akbar's son Selim, who afterwards succeeded his father on the throne, under the name of Jehángír. Abu-l-Fazl wrote several works, which have ensured him a conspicuous place among the best authors, as well as among the most enlightened statesmen of the East. His principal works are the 'Akbar-Náma,' which exists as yet only in MS., and contains a history of the reign of Akbar, down to the time of the author's death; the 'Ayin-i-Akbari,' or 'Institutes of Akbar,' which gives a statistical and political description of the Mogul empire; the 'Ayári Dánish,' or 'Touchstone of Knowledge,' a translation into Persian of the Fables of Pilpay; and 'Maktúbat,' or 'Inshác Abu-l-Fazl,' which contains his correspondence. Persian Translations of the great Sanscrit epic 'Mahábháratá,' and other Sanscrit works, were made under his learned patronage.

ABU'LFEDA, or, with his full name, *Emad-eddin Abulfeda Ismaïl ben Ali*, was the descendant of a branch of the Ayubite dynasty, which Saladin, in A.D. 1182, appointed to the sovereignty of the three towns, Hamah, Maarrah, and Barin, in Syria, and which continued to hold that dignity even after the Bahrite Mamluks, under Azz-eddin Ibek, had, in A.D. 1254, put an end to the Ayubite dominion over Syria and Egypt. Abulfeda was born in A.D. 1273, at Damascus, whither his parents had fled at the approach of the Tartars. While a youth, he distinguished himself in various campaigns. In 1285 he was present at the siege of Markab, in 1289 at that of Tripoli, in 1291 at the taking of Akka (St. Jean d'Acre), and in 1292 he was present under his father Ali at the storming of Kalát Ar-rúm, a fortress on the Euphrates. After the death of his father, in 1295, he was treated with parental care by his cousin Modhaffar, then king of Hamah. On the death of Modhaffar, in 1299, the Bahrite Sultan Nasir declared the fief which the Ayubites held under him to have become extinct, and assigned a small pension for their maintenance. When, however, ten years afterwards, Sultan Nasir became personally acquainted with Abulfeda, he not only restored to him (1310) the former dignity of his family, but soon after, as an acknowledgment for his services, raised him to the rank of *malik*, or king. He continued on the most friendly terms with Nasir, till his death, October 26, 1331. The numerous works which he has left behind attest the extent and variety of his information. Among them we find mentioned works on medicine, Mohammedan jurisprudence, mathematics, and philosophy; those most commonly known are a treatise on geography, entitled 'Takwim al Boldan,' or 'Disposition of the Countries;' and an historical work called 'Mokhtasar fi akhbari-l-bashar,' i.e. 'A Compendium of the History of Mankind,' which is very valuable, as being the most important oriental source for the history of the Crusades, which we possess. The part of the work which treats of the history of Mohammedanism, was translated by Reiske, and edited with the Arabic text by Adler, at Copenhagen, in 5 vols. 4to, 1789-94; an edition and translation of the ante-Islamitic part has been published by Fleischer, Leipzig, 1831, 4to.

ABURY. [AVEBURY.]

ABUSHIRE, or BUSHIRE, a sea-port town in the province of Farsistan, Persia, is situated on

the north-east coast of the Persian Gulf, in 29° N. lat., 50° 52′ E. long. The population is estimated at from 15,000 to 20,000. Abushire stands at the northern extremity of a sandy peninsula, which forms on the east and north-east a deep bay. Ships of about 300 tons burthen can lie in the inner roads about six miles north from the town, and ships of larger burthen in 25 feet of water, three or four miles west from the town. The anchorage is tolerably good, but during violent gales from the north-west, ships are obliged to bear up for the small island of Karak to the W.N.W. There is deep water directly east from the town, but a bar prevents vessels drawing more than from 8 to 10 feet water from reaching it. The anchorage at Karak is safe at all times, and ships can lie close to the shore. Water, which is excessively bad and dear at Abushire, can be had in abundance at Karak. The climate is extremely hot, especially in June, July, and August.

Abushire is the emporium of a large commerce between the East Indies and Persia, its merchants supplying almost all Persia with Indian commodities as well as with many of those of Europe, and exporting in return the productions of Persia and Turkey to the East Indies and to Europe. Of the imports from India the most important are indigo, sugar, and spices; of the Persian exports, raw silk is the most important.

ABUTMENT, in building, that which receives the end of and gives support to anything having a tendency to spread. The piers or mounds on or against which an arch that is less than a semicircle, or a series of such arches, rests, are abutments; while the supports of a semi-circular or semi-elliptical arch, or of an arch of any other figure, which springs at right angles to the horizon, are imposts. Nevertheless, the piers at the extremities of a bridge, of whatever form its arch or arches may be, are always termed its abutments.

ABUTMENT, in machinery, is a fixed point from which resistance or reaction is obtained. Thus the breech of a gun forms an abutment for the expansive force of the powder; and in an ordinary steam-engine, each end of the cylinder acts alternately as an abutment for the steam, which, being unable to expand itself in the direction of the fixed obstacle, expends its whole force against the piston or moveable obstacle. Even a rotatory steam-engine, with a continuous circular action, must have an abutment, although in the primitive rotatory engine of Hero of Alexandria, and in some modern machines on the same principle, the abutment is found in the resistance of the air. Springs, whether used, as in a watch, to impel machinery, or, as in the various kinds of spring-balance, to measure or control force, must in like way have their abutments, as also must all machines in which power is transmitted by means of screws. The name is applied in carpentry to a joint in which the end of one piece of timber is joined to the side of another, so that their fibres form an angle with each other.

ABUTTALS (from the French *abutter*, to limit or bound) are the buttings and boundings of lands to the east, west, north, and south, which show by what other lands, highways, hedges, rivers, &c., such lands are in those several directions bounded.

The boundaries and abuttals of corporation and church lands, and of parishes, are usually preserved by an annual procession, or perambulation, as it is called.

ABYDE'NUS, also called Abidenus by Eusebius, a Greek historian, who is known to us only as the author of a history of Chaldæa, or, as it is commonly called, of Assyria (Ἀσσυριακά), which is lost, with the exception of some fragments preserved in Eusebius, Cyrillus, Syncellus, and Moses of Chorene. The time at which Abydenus lived is not certain: he must however belong to a later period than Berosus, who lived about B.C. 250; for in one of the fragments still extant, Abydenus mentions Berosus among his authorities. The fragments of the history of Abydenus are collected in Scaliger's work, 'De Emendatione Temporum,' and more completely in J. D. G. Richter, 'Berosi Chaldæi Historiæ quæ supersunt,' &c., Leipzig, 1825, 8vo, p. 38, &c., and p. 85, &c.

ABY'DOS was an ancient Greek town on the Asiatic shore of the Hellespont, or Dardanelles. Sestos is on the opposite European shore. It is said by Strabo to have been founded by the Milesians. Abydos was burnt by Darius the Persian, after his Scythian expedition; and somewhat later (B.C. 480) the people of Abydos witnessed the crossing of the immense army of Xerxes over the Hellespont by a bridge of boats. This bridge did not extend obliquely from Abydos to Sestos, which was a distance of more than three English miles, but directly across at a narrower part, where the distance is somewhat less than one mile. It commenced on the Asiatic side, a little higher up the stream than Abydos, and terminated on the opposite coast at the projecting point opposite to Abydos, and between Madytus and Sestos. A description of the bridge of Xerxes is given by Herodotus (vii. 36), who was on the spot probably much less than half a century after the event. No traces of the ancient town remain, except the foundation walls of a building of considerable size.

Abydos has obtained a poetical celebrity from the story of Leander, who used to swim across the Hellespont to visit his mistress, Hero. Lord Byron's poem of the 'Bride of Abydos' contains a passage relating to this story.

ABY'DOS, an ancient city of Upper Egypt, the remains of which are found near two villages, El Kherbeh and Harabat, about 6 miles from the west bank of the Nile, 26° 12′ N. lat. The chief building, which still remains, is nearly covered with sand, but the interior is in good preservation. This edifice is constructed of both limestone and sandstone. The numerous apartments it contains, and the style of decoration, show that Abydos was once a place of importance, and possibly a royal residence.

In the year 1818, Mr. W. Bankes discovered on an interior wall of a building at Abydos, not belonging to the great edifice, a kind of tablet or genealogy of the early kings of Egypt, which is

now generally called the 'Table of Abydos.' This tablet consists of three compartments lying horizontally one above another, and each compartment has been divided into twenty-six rectangles, so that the whole has once contained seventy-eight rectangles. Each of these rectangles contains an elliptical ring, or cartouche as it is sometimes called, such as may be seen on the Egyptian monuments in the British Museum; and each cartouche contains those various figures which are now admitted to indicate the names or titles of sovereigns. The lowest of the three compartments contains in the nineteen rectangles which are complete the title and name of Ramses the Great, perhaps the Greek Sesostris. The fifty-first and fifty-second cartouches are said to contain the name and title of another Ramses, while the forty-seventh is said to contain those of Amenophis II., the Memnon of the Greeks. Of the other cartouches nothing certain is affirmed.

(*Westminster Review*, No. xxviii. p. 405.)

ABYSSINIA. This African country is an elevated table-land, lying between 8° 30′ and 15° 40′ N. lat. and between 35° and 42° E. long. The north-eastern edge of the table-land is directed towards the Red Sea, and is from 30 to 60 miles from its shores; the other or inland edges slope away to a lower level on every side: so that if the surrounding part of Africa were covered with water to the depth of a few hundred feet, the whole of Abyssinia would form an island. The river Hawásh forms the southern boundary of the table-land; and from the valley of this river the country rises gradually to a ridge which may be between 7000 and 8000 feet above the sea, and constitutes in these parts the edge of the table-land. Towards the north-west the table-land falls off in inclined plains of immense extent, until it terminates on the banks of the Nile in Shendy (between 16° and 18° N. lat.). There is a mountainous region in the middle of Abyssinia, which separates the table-land into two portions, the north-eastern and the south-western.

Physical Geography.—The *North-eastern Table-Land*, or *Table-Land of Tigré*, extends from 11° 30′ to 15° 40′ N. lat., and between 42° and 39° E. long. The edge of the table-land towards the Red Sea is crowned with a ridge of hills, which rise from 500 to 1000 feet higher than the table-land itself; and from the base of these hills the country descends gradually to the west. This tract suffers from want of water, and is therefore sparingly inhabited. It supplies pasture for a great number of cattle, black sheep, and fine goats; asses and mules are also kept, and these animals constitute the wealth of the inhabitants, as cultivation is limited to the base of the hills, on which the villages are generally built.

South of 15° N. lat. the hills on the edge of the table-land form two ranges, which inclose a longitudinal valley. The declivities of these ridges are partly covered with low bushes and partly with grass; and the included space consists of a succession of table-lands several miles in extent, and of small valleys, the sloping sides of which are very steep. The table-lands are partly bare and partly overgrown with bushes and grass; some of them afford good pasture, and in some places cultivation is carried on to a considerable extent, but in general it is limited to a few spots. A mountain-tract traverses the country from east to west: it is several miles in width, and consists of steep hills with deep depressions between them. Only a small portion of this tract is available for pasture, as the hills are generally rocky and bare, and there is little cultivation. South of this tract lies the Plain of Antálo, in which the capital of Tigré is built on the declivity of a range of hills. The portion of this plain which surrounds the town of Antálo is considered the best part of Tigré: it is for the most part rather hilly, and the channels of the rivers are bounded on each side by steep slopes. Agriculture extends over the acclivities of the hills, and even their flat tops are sometimes cultivated. The plain descends towards the river Takkazie very rapidly; and at the same time cultivation ceases almost entirely, and the country is covered with dark brushwood full of game. From thence to the Red Sea the cultivation is very limited.

North of the Plain of Antálo, and west of the Haramat Mountains, is the Plain of Tembien, much less elevated than the other. The entrance from the one plain to the other is by the Pass of Atbara. The Plain of Tembien, about 100 miles long by 30 wide, has a few cultivated spots, but the greater part of the plain consists of low sandstone hills, and the soil is sandy and unfit for cultivation: in the middle of the plain there is an extensive tract which constitutes a fine pastoral country, and is interspersed with trees. North of the Plain of Tembien are those of Shiré and Serawé: they are more elevated than the first-mentioned plain, being at least 7000 feet above the level of the sea. The Plain of Serawé is celebrated in Tigré for its flowery meadows, shady groves, and rich valleys. From the banks of the river, one long and steep ascent brings the traveller to the plain, whose surface is composed of sandstone, and on which a great number of volcanic cones rise to some height. On the plain are several hilly ridges, but the greater part is covered with bushes, between which there are excellent pasture-grounds. The herds of cattle on this plain are large and numerous; but agriculture is limited to a few places. A hilly region separates the plain from the Hamarat mountains: the rivers which originate in it run westward, and form by their union the Mareb.

The southern part of Tigré, or that which is south of the Plain of Antálo, is mountainous. It comprehends the upper basin of the Takkazie and the whole basin of its affluent the Tzelari. Near the source of the Tzelari is the ridge between the rivers which flow north and south; and at some distance from it are two large lakes, the Tzado Bahari, or the great lake of Ashangi, and the Guala Ashangi, or Machakh. The country surrounding these lakes and the source of the Tzelari has a great elevation above the sea-level, and the climate is excessively cold. The district is a complete wilderness; there is neither village, nor cultivation, nor cattle, nor wild beast except the fox:

it suffers extremely from want of water all the year round. To the east of this central table-land of Abyssinia extends a mountainous country, inhabited by the Raia or Azabo Gallas, who are described as the most savage of all the tribes of Africa. The whole of the Tzelari region is represented as resembling a sea agitated by a gale, rising in numerous hills like waves, with large spaces of lower ground between them. For the greater part of the year it is almost destitute of water, which is only found in *wadies* (or valleys), which are dry during the summer. In these wadies there are only a few pasture-grounds and cultivated spots. The Takkazie is the second river in Abyssinia in size, the Abái, or Nile, being the first: it originates near 12° N. lat. and 39° E. long., and flows north-west to the boundary of Abyssinia. The Takkazie joins the Nile in Nubia, not far from Meroe, and discharges into it a large mass of volcanic debris.

The *South-western Table-land*, comprising the provinces of Amhára and Shoa, contains the highest mountain-range in Abyssinia. This range in the most eastern portion of the country is close to the banks of the river Takkazie, which separates Amhára from Tigré. The most elevated summits are towards the northern extremity of the range, where the peak called Abba Yaret rises to 15,006 feet, and that which bears the name of Buahat to 14,364 feet above the sea-level: there is a pass, between the two summits, more than 12,000 feet high; and Rüppel found, even in the month of July, the upper part of these mountains, to a distance of 1500 feet below the summit, covered with snow. The sides of many of the mountains in this range are clothed with trees or fine grass, and the bottoms are either meadows or fields in which barley is cultivated and yields good crops. Agriculture is favoured by the climate, which all the year round resembles the spring in central Europe. The western declivity of the mountains terminates at the Plain of Entshetquab, which is about 10,000 feet above the level of the sea. The plain has an undulating surface, and is entirely destitute of wood, except those clumps of trees which surround every church in Abyssinia. Rüppel passed the months of July, August, and September, 1832, in Entshetquab, and found the temperature a little lower than that of London at a similar season. The Vale of Shoada separates this plain from that of Wogghera, which is on a lower level. This second plain is very hilly near the vale; but farther on it is almost a dead level, with a few isolated hills—all of volcanic origin and of conical shapes—dispersed over it. The incessant civil wars from which this country has suffered for nearly a century, have driven away the husbandman, and his place is supplied by wandering herdsmen, who go with their herds and flocks during the dry season to the low country on the lake Zána.

The northern boundary of the Plain of Wogghera is formed by a rocky ridge, which separates it from the table-land of Adarga. The place where the caravan-road cuts the ridge is known as the Pass of Lamalmon, which is of very difficult ascent, and 8802 feet above the sea-level; and near the base of the ridge, the plain is interspersed with numerous volcanic cones, covered with brush-wood. In advancing farther north, the plain becomes more level, and in the valleys are sycamores and other large trees. Westward of this plain are two provinces which have never been visited by Europeans; but westward of the plain of Wogghera is a hilly tract which has been examined, viz. the *Table-land of Kulla*. Its highest level is on the ridge which separates it from the low lands surrounding Lake Zána; and its summit, where it is passed by the road, nearly due north of Gondar, is 1200 feet above that town, or about 8600 feet above the sea-level. On the north of this ridge the country descends considerably, through a labyrinth of rugged mountains; but at a few miles from the pass the surface of the country is less hilly, and the descent more gradual. Cultivation is here in due proportion united to pasturage. Further north is a lower country, uninhabited on account of the bad air; through want of ventilation, the vapours rising from the surface accumulate to such a degree that it cannot be passed by any person without contracting a malignant fever. Southward of the district just described is a less elevated tract of country, having Lake Záha or Dembea in its centre, and the surrounding land divided by mountain ridges into three plains—those of Dembea, of Biegemider, and of Miécha. The Plain of Dembea, also called the Plain of Gondar, from the capital of Amhára, which is built on hilly ground at the north-eastern extremity of the plain, has an elevation of from 6000 to 7000 feet. Near the margin there are numerous volcanic hills, mostly overgrown with bushes; and in their vicinity the soil is fertile, and part of the country is under cultivation. In the dry season, from October to April, the country is almost covered with herds of cattle. There is more rain at Gondar than usually occurs at so high an altitude (7420 feet), owing to its being surrounded by hills a thousand feet higher than itself. The narrow strip of low country, which lies west of Lake Zána, is a part of the Plain of Dembea. The declivities of the hills are overgrown with bushes and stunted acacia-trees; and at their base the country is fruitful, and a considerable portion of it under cultivation.

The Plain of Biegemider, which lies on the eastern side of Lake Zána, is watered by the Keb and other rivers, among which is one branch of the Nile. The northern part consists of two tracts of different characters: a lower one skirting the shores of the lake for several miles, which in the rainy season is inundated, and in the dry season covered with aquatic plants or grass; and a more elevated part which has an undulating surface, and is covered with low bushes. Neither tract is under cultivation, but both supply pasture. The most southern district of the plain has a very broken surface, being traversed by several ridges of rocky hills, covered with fine forest-trees; and as the depressions are extensive and well watered, and have a fertile soil, cultivation is carried on to a great extent.

The Plain of Miécha is a kind of peninsula,

about half as large as Ireland. The river Abái (a branch of the Nile) and Lake Zána surround it on the north, west, and south. This river rises near 11° N. lat. and 37° E. long., the source being 8700 feet above the sea-level. After running northward for about 60 miles in a straight line, the Abái descends to the level of Lake Zána very rapidly; so that the current is extremely swift, and forms a kind of continuous rapid, interrupted by some cataracts. The Abái enters Lake Zána on the south-west side, and leaves it on the south-east side. This lake is about 50 miles long, and the number of rivers which it receives from all sides is very great; those which join it from the north and west are dried up during a great part of the year, but most of those which fall into it from the east and south have a considerable supply of water all the year round. The immense quantity of water which the lake receives during the rains raises its level sufficiently to lay under water the low country on its banks to the distance of two miles. There are many islands in this lake. The Abái river leaves Lake Zána near its south-eastern corner, and flows in a very rapid current, often interrupted by cataracts, to the confines of Abyssinia. The peninsula round which this river flows is traversed by a mountain-range, whose general direction is from west-north-west to east-south-east. This range is crossed by the great commercial road leading from Northern Abyssinia to Gójam: the summit of the mountain pass, through which the road runs, is at least 11,000 feet above the sea-level. It does not appear that any summit of this range is always covered with snow, but the higher portion is cold from November to March. There is a low plain along the shores of the lake, which is narrow near the pass, widens as it proceeds southward, and where it reaches the Abái river is 20 miles wide: this plain is very fruitful, the soil being an alluvium, composed of the detritus brought by the rivers from the higher country. A large portion of the country is well cultivated, and produces abundant crops of every kind of grain. A narrow tract near the lake is too swampy for cultivation, and is partly used as pasture-ground, but the greater portion of it is overgrown with aquatic plants, especially a large kind of rushes, which for want of wood are used for the construction of the small boats by which the lake is navigated. There are no trees or bushes on the plain, except near the base of the more elevated tract south of it, where there are groves of acacias. Farther from the lake are hilly tracts, the soil and climate of which differ according to elevation.

The country which extends from the bank of the Zingini to the western boundary of Abyssinia is very fertile, being formed by the disintegration of volcanic rocks, which in some places protrude through it. Near this is a continuous ridge of high hills, which consists of a mass of volcanic cones or high-pointed domes; and from the west of this elevated mass several lower ridges run off to the westward to the distance of several miles, where they terminate with bluffs in the adjacent plain. This tract, by means of irrigation, yields abundant crops; but the plain, which extends farther westward, is of indifferent quality, and chiefly covered with brushwood, with occasional patches of cultivation. Dr. Beke, who in 1841 and 1842 passed a whole year in these regions, states that the rains are more heavy and continual in the peninsula of the Abái than in the Plain of Gondar. The rainy season lasted from June to September; but rain fell every month except January.

The south-eastern portion of Abyssinia constitutes the kingdom or district of *Shoa*. The Jamma, one of its rivers, is the largest tributary which the Abái receives on the table-land of Abyssinia: it drains a wide extent of country, and brings a great volume of water to the Abái. The valley of the Jamma appears to be inclosed on the north as well as on the south by high mountains, which rise from 4000 to 5000 feet above its level: the ascent is steep, but there is usually a wide terrace between two steep acclivities. The number of rivers which join the Jamma from the south is very great. Though their course towards the interior of the table-land is not rapid, they run with great velocity as they approach its northern edge, and most of them fall precipitously several hundred feet into a ravine, in which they continue to flow to their receptacle: thus the edge of the table-land is cut by narrow valleys into a great number of comparatively narrow ridges, which give it the appearance of a very mountainous country. The southern edge of this table-land is not well known; but the eastern edge descends by a slope from an elevation of 8000 to one of 2000 feet. This steep descent is much broken, consisting of a succession of valleys and hills, which are partly wooded and partly cultivated. The villages are small, but numerous; they consist of a few houses, which have a circular form, with a conical roof, and are perched on the sides or summits of the hills. At the edge of the slope is the town of Ankóbar, elevated no less than 8198 feet above the sea; at a few miles from Ankóbar are mountains 11,000 feet in height. The country which lies contiguous to the steep ascent of the table-land (from 9° 30′ to 11° N. lat.) on the west continues for a short distance to preserve the elevation of the edge, and then slopes gently to the west. The surface is generally level, forming plains interspersed with small hills or short low ridges, and is distinguished for the deep depressions in which the rivers run; they fall down in cataracts several hundred feet high into deep basins, and below these basins they continue to flow between steep and lofty banks; the descent to them is frequently 500 or even 1000 feet. The valley through which the Kachena, an affluent of the Wanchit, runs, is 3000 feet below the upper edge of its banks and the general level of the country. These valleys are generally well wooded; but the table-lands between them are destitute of trees and bushes, and are only used as pasture-ground.

Natural Productions.—Though Abyssinia is situated between the tropics, its productions rather resemble those of the temperate than

of the torrid zone. Few of the grains of India are found here. The other grains are wheat and barley, the latter grown most extensively, as it is the only corn given to horses and mules: oats, Indian corn, durrha, and tokussa are cultivated. The leguminous vegetables which are most extensively grown are beans, lupines, lentils, and a kind of vetch; and among other vegetables are garlick, onions, and capsicums. There are some small plantations of coffee; and cotton is grown in the lower parts of the country. Excellent grapes grow at the foot of the rocky masses to the east of Lake Zána. The jessamine, and a honeysuckle resembling that of England, are plentiful in some parts. Bruce speaks of lemons and citrons growing wild in the woods.

The domestic animals consist of horses, cattle, sheep, goats, mules, and asses. The Sanga oxen are found in the countries south of Antálo, and are remarkable for the great size of their horns, which sometimes are nearly four feet long. There is also the black sheep, which seems to be peculiar to this region; the wool is of a black colour, and about eighteen inches in length. The people take great care of these animals, lest they should get too fat, for then the wool falls off; they are placed on frames, cleaned every day with water, and fed with roasted barley and other food. A skin of good quality is sold for a dollar and upwards, which is a very large sum in that country. These skins are worn by the warriors.

Wild animals are very numerous: there are lions, elephants, buffaloes, leopards, lynxes, wild-cats, hyænas, a small species of wolf, a small species of fox on the table-land of Wofflu, and the jackal. The larger quadrupeds are found only in the wildernesses which lie along the northern and southern boundary of the country. Elephants, buffaloes, the two-horned rhinoceros, giraffes, zebras, quaggas, wild asses, antelopes, and two kinds of boars, are found. Of smaller animals, there are porcupines, rock-rabbits, ground-squirrels, ferrets, polecats, and otters. Fowls are generally kept. There are eagles, vultures, Alpine ravens, and Rüppel met with three kinds of parrots. In Tigré there are herons and hornbills. The Egyptian goose and a species of duck, with several other kinds of water-fowl, frequent the swamps and lakes. Guinea-fowls, red-legged partridges, quails, snipes, larks, and pigeons, abound all through the country.

Hippopotami are abundant in Lake Zána and the larger rivers, where many are killed annually for their flesh and hides. Bees are so common that honey is very abundant, and is used instead of sugar. Locusts frequently lay waste the fields, especially on the table-land of Tigré.

Gold has occasionally been found in Abyssinia. The mountains of Lasta are rich in iron-ore, which is worked, and appears to be of good quality. The great salt-plain which lies between the Red Sea and the table-land of Tigré belongs partly to the sovereign of Tigré, and immense quantities of rock-salt are annually taken from it and imported to all parts of the country, as it is not only used for culinary purposes, but also as currency. [ADA'L.] Large quantities of salt, taken from the salt lake Assal, are annually imported into Shoa, as salt is not found on the table-land. Sulphur is found at several places.

Population and Inhabitants.—From the combined researches of Rüppel, Beke, and others, it is supposed that the whole population of Abyssinia may amount to about three millions; an estimate which gives less than ten individuals to a square mile.

Rüppel distinguishes three different races among the inhabitants of Abyssinia. The bulk of the population belong to the Caucasian race, and in features do not differ from the Bedouins of Arabia. They inhabit almost exclusively the northern parts of Amhára, and are also numerous in Tigré, and in most of the southern districts of Amhára. Another race is found mingled with them, more closely allied to the inhabitants of the interior of Africa, and distinguished by a somewhat curved nose, thick lips and lengthened eyes, and by black but curly hair, very thick, almost woolly: they are most numerous in the northern districts of Tigré. The third race are the Gallas. Their faces are round, the nose straight and short, the lips rather thick, but do not resemble those of the negroes; the eyes very lively, small, and deeply set in the sockets; and their body is rather stout and large. There are no negroes in Abyssinia, except the slaves which are brought from the countries of the Shangallas, who inhabit the border countries to the west of the peninsula of the Abái. These negroes are the only blacks in the country. The colour of the other inhabitants varies from the darkest black-brown to the clearest light-brown.

Of the manners of the Abyssinians of Gondar we have an elaborate picture by Bruce; which has, however, always been received with some doubt. He describes a feast of the higher classes, in which a cow or bull is brought to the door; the feet are tied; the skin is stripped off the hind quarters; and the flesh is cut off from the buttocks in solid square pieces. That the Abyssinians eat raw flesh occasionally has been proved by Pearce, who once saw some brutal Lasta soldiers, on a marauding expedition, while driving a cow, cut two steaks from the rump, which they devoured raw, to satisfy their craving hunger: the animal was then driven on to the camp and killed. But Pearce, who had been several years in Tigré, never heard of such feasts as Bruce describes; nor did Salt meet with any corroboration of the more highly-coloured portions of Bruce's narrative. Salt, who lived three weeks at Chelicut, saw the Ras or chief daily, and was often invited to his evening repasts, saw none of the indecencies and grossness which Bruce describes: intoxication, however, is common at feasts.

The Abyssinians even now are not without authors and painters, and they are generally fond of pictures, with which they line the inside of their churches and decorate their chief apartments.

Of the languages of Abyssinia, one, called the Geez or Ethiopian, resembles the Sanscrit of India in being a dead language, in which the

sacred books are written. The spoken languages are derived from it, and constitute four dialects, namely, the languages of Amhára, Tigré, Shoa, and of the Yejjoos. They are comprehended under the name of Amháric languages, and differ considerably; but the people understand one another, and do not need an interpreter. The language of Gondar is considered to be the purest Amháric. The language of the Gallas is radically different. There are also three other languages spoken in Abyssinia, which, however, are limited to a small number of people. There are two tribes called Agows: one of them lives near the western border; and the other at a great distance, on the western banks of the Takkazie. The languages spoken by the Falasha and by the Gamants, two tribes inhabiting the Semien mountains, are nearly identical; but they differ from the Amharic and Galla languages, according to the statement of Rüppel. He adds to these languages that of the Shangalla Takkazie, who inhabit the wilderness north of Shiré and Waldubba, and who, according to his statement, are not negroes; but the Shangallas, who live along the western border of Agaumider, are true negroes, and speak a different language.

The Abyssinians are Christians, but their tenets differ materially from those of the Roman and Greek churches, so that their religion must be set down as the fourth great section of the Christian community. They are called Coptic Christians, and the head of their church, named Abúna, is ordained and sent out by the archbishop of Alexandria. A great number of the Gallas, as well among the Wollo as among the southern tribes, as far as they are subject to the king of Shoa, have also embraced Christianity. In every part of Abyssinia there are many Mohammedans. The Falashas in the Semien mountains, and the Gamants in the hilly region west of the table-land of Wogghera, are a sect of Hebrews, who have adopted a few ceremonies of the Christian community. Many Falashas are settled at Gondar, where they inhabit a separate quarter of the town called Falashabad. The Gallas who inhabit the banks of the Hawásh are still heathens, and so are the Shangallas. On the shores of Lake Zána live the Waitos, who are considered heathens, but they conform to most of the rites of the Abyssinian Church, except that they do not observe the frequent fastings, which amount to 192 days in the year, and some other observances of that community.

Industry and Commerce.—The Abyssinians have made tolerable progress in manufactures. The best article is tanned skins, which are used for bedding or for tents: an important article, on account of the numerous caravans which traverse the country. Shields made of the hides of elephants or rhinoceroses are also good. Axes and ploughshares, as well as spear-heads, are made at several places, but knives, sword-blades, scissors, and razors, are only made at Gondar and at Kiratza. At Gondar guns are made, but only by some Greeks, not by the natives. Large quantities of coarse cotton-cloth are made in several parts of the country by women, and a finer kind, with a red or blue border, for the more wealthy classes of society. The silk manufactures are limited to some embroidery, made by Mohammedans and worn by their women, and to blue strings, which are worn on the neck by all Christians, as a mark of distinction from Mohammedans or heathens. A coarse stuff is made from the wool and hair of the black sheep and goats, which is also employed in making a kind of counterpanes. Coarse black pottery is made in every part of the country. Printing has not yet been introduced into Abyssinia, and the copying of manuscripts forms a distinct branch of industry.

As Abyssinia does not border on the sea, it has no immediate intercourse with seafaring nations, but its products are carried either to Massówa on the Red Sea, or to Tajurrah on the Gulf of Aden. Massówa is the harbour of Tigré and Amhára; and Tajurrah the harbour of Shoa. Nearly all the articles imported into Massówa go to Abyssinia. They comprise raw cotton, pepper, blue and red cotton-cloth, the threads of which are unravelled and woven into the borders of the cloths of native manufacture, raw silk dyed blue, white cambrics, a small quantity of glazed silks, and some common velvet, glass pearls, linen shirts, common red cloth, some articles of glass, common razors, sword-blades, spica celtica, small parcels of red or green morocco leather, zinc, common Turkish carpets, bottles of a peculiar shape, of which large numbers are used in Abyssinia, and a large quantity of Persian tobacco.

The bulk of the goods imported into Abyssinia is probably consumed there, but some of them find their way into the interior of Africa to supply other countries. They are exchanged for the produce of these countries at Báso, where a market is held weekly during the season, which lasts about eight months in the year. The merchants bring from the southern countries slaves, ivory, coffee, civet, gold, cloth, iron, and cattle.

On comparing the imports from these southern countries with the export trade of Massówa, it is evident that most of the exported articles, and also most of the imported, are not of Abyssinian growth, and that this country produces very few articles for foreign commerce. Nearly all the merchants of the country are engaged in this transit trade, which is carried on by means of caravans.

History and Government.—The name of Abyssinia became known in Europe from the Portuguese missionaries who penetrated there, and who often wrote the names of the country and the people respectively in the Latinized forms of *Abassia* and *Abassinos*, from which our common term *Abyssinia* is derived.

The Abyssinians (whose earlier history is merely traditional) were converted to Christianity in the time of the Emperor Constantine by some missionaries sent from Alexandria. The power of the emperors of Abyssinia seems then to have been well established. In the sixth century they were able to send an army to Arabia and to conquer a part of Yemen: this was the period of the greatest political power of Abyssinia. Seventy years afterwards the Abyssinians were deprived

of Yemen, probably by the Arabs, who soon attacked Abyssinia itself. After this time great disorder crept into the internal affairs of the empire, for in the year 925 a Jewess, called Sague, overthrew the reigning dynasty and destroyed Axum, the ancient capital. [AXUM]. For more than three hundred years the country appears to have remained in a distracted state, until the Emperor Iquon Amlaq recovered the whole kingdom, about 1255; and during the following three centuries the country improved. Towards the end of the fifteenth century Pedro Covilhão, an agent of the court of Lisbon, visited Abyssinia, and this circumstance saved the empire from destruction; for the embassy aided the emperor in repelling a neighbouring foe: the empire was saved, but the southern provinces were lost. By these events the seat of the emperor was transferred from Shoa to Gondar. The court adopted the Romish faith, but the people adhered to the ancient tenets; and after a long struggle between the sovereign and his subjects, the emperor was obliged to give way, and the Roman Catholic priests were expelled in 1632. During this period of anarchy the governors of the provinces made themselves independent, and thus arose the unsettled state of the country which has ever since existed. One of the chiefs of the southern provinces, named Nagáse, made himself king of Shoa about a century and a half ago, and shook off the supremacy of the emperor, whose capital was at Gondar. His successors began to enlarge their territories; and in one century or a little more they extended their authority over a country covering at least 12,000 square miles.

For more than a century Abyssinia has been in a state bordering on anarchy. An emperor is the sovereign of the whole country, but his authority is only nominal, and his revenues consist of a small annual pension, and a share of the excise levied on the butter sold in the market of Gondar. The governors of the provinces have usurped his authority in their respective districts. They are almost continually in a state of war with one another, and the stronger expels his neighbour from his possessions, and gives them to his relations who are most in favour with him. The governor in possession of the town of Gondar creates the emperor. A few years ago eight persons were alive, each of whom had been emperor, and some for only a few weeks or months.

There is hardly a place which deserves to be called a town in our signification of the word. The manufacturing industry is too small to collect a number of individuals in one place, and each usurper chooses a new place for his residence, which thus acquires importance, but its ruin begins with his death: even Adówa, though a commercial place, is going to ruin. [ADÓWA.] The town of Gondar alone still retains some importance. The kingdom of Shoa forms an exception. Though this state is of modern date, its internal organization appears to have acquired a considerable degree of stability. It has also acquired a power which renders it superior to all the neighbouring chiefs, and enables it to keep them in check. The capital of Shoa is Ankóbar. It is situated on the ascent of the table-land, not far from its upper edge. This town is built on two wooded hills, of which the higher and northern one is hedged in with long poles connected by branches of trees, like palisadoes, and on the summit is the king's residence, built of stone, with a thatched roof and numerous outbuildings. The southern hill is clustered with houses, chiefly of wood with thatched roofs. The population may amount to between 8000 and 10,000, exclusive of the king's household, which consists of more than 1000 persons.

(Salt's *Abyssinia*—Bruce's *Travels*—Valentin's *Travels*—Rüppel's *Reise in Abyssinien*—Journals of Gobat, Isenberg, and Krapf—Kirk and Beke, in *London Geographical Journal*, v. 12 & 14.)

ACA'CIA, the name of a plant of the Pea-Tribe, mentioned by Discórides, as a useful astringent thorn, yielding a white transparent gum. The account given by this Greek author, meagre as it is, accords so well with the gum-arabic trees of modern Egypt, that we can scarcely doubt their identity. Accordingly it is to these, and to others closely related to them, that the classical name is still applied.

Among the moderns, the Acacia is a very extensive genus of trees or shrubby plants, inhabiting the tropical parts of both the Old and New World, and only, in a very few instances, extending into temperate latitudes; though the species are spread in much abundance over the whole of Australia, and its dependent islands.

Some of the species produce catechu and gum-arabic; the bark of others yields a large quantity of tannin, which, in the form of an extract, is annually imported from Van Diemen's Land in considerable quantity; the species from which this substance is procured are chiefly *A. decurrens* and *mollissima*. As objects of ornament they are usually of striking beauty; and it may be doubted whether, in the whole vegetable kingdom, equally brilliant colouring, and elegant foliage, combined with a most graceful aspect, are united in the same individuals.

Botanists are acquainted with nearly 300 species. Of these we shall mention only a few of the most interesting.

The species are extremely variable in the structure of their leaves and flowers. Some of them have true leaves that are twice or thrice pinnate, with a multitude of minute, shining, or at least even, leaflets; others have, in a perfect state, no leaves properly so called, but in their stead the leaf-stalks enlarge, and assume the appearance, and no doubt also the functions, of true leaves: species of the latter description are known by their spurious leaves being expanded vertically, instead of horizontally, as in leaves of the ordinary construction.

Acacia Catechu. The catechu acacia is a tree with a tolerably high and stout stem; found in mountainous places in the East Indies, especially in Bengal and Coromandel. It is most common in Canara and Bahar. Its pods are from 2 to 3 inches long, quite flat, and of a narrow oval figure. Its unripe pods and wood yield, by decoction, one of the sorts of catechu, or terra-

japonica, of the shops, a powerfully astringent substance, formerly thought to be a kind of earth.

Acacia Arabica, the gum-arabic tree, is an inhabitant of the East Indies, Arabia, and Abyssinia, where it forms a tree thirteen or fourteen feet high, of inelegant appearance; easily recognized by its long curved pods, which are divided into a number of round compressed joints, by means of contractions between the seeds. This is one of the plants that yield the useful substance called gum-arabic, which is procured by wounding the bark; after which the sap runs out, and hardens in transparent lumps, of various figures, very similar to the concretions found upon the bark of the cherry-tree in this country. Gum-arabic is also produced abundantly by some of the species nearly related to this, such as *A. Nilotica*, or *vera*, found in Egypt; *A. Ehrenbergii*, a native of Dongola; *A. tortilis*, a common plant in the west of Nubia, Kordofan, and Arabia, especially upon Mount Sinai; and *A. Seyal*, an inhabitant of Upper Egypt, Nubia, and Western Arabia. It is supposed that gum-arabic is collected indifferently from all these, and that the gums of Jidda and Bassra, gum-thur, and East India gum, are only picked samples. Gum-senegal is the produce of a distinct species, called *A. Senegal*, found in Arabia and the interior of Africa. From this tree are said, by some, to be procured the pods called *bablach* in the continental drug-shops; by others, however, they are referred rather to *A. cineraria*, and some other species.

Acacia discolor, the purple-stemmed acacia, is a middle-sized tree, found in the southern parts of New Holland and in Van Diemen's Land, where it, in common with many others of the same genus, is called *Wattle*.

Acacia Julibrissin, silk-tassel acacia, is a native of Persia and of the Levant. Its specific name is Latinised from two Persian words—*gul*, a rose; and *ebruschim*, silk; by which it is known in the countries where it grows wild. There it becomes a small tree, remarkable for its light airy foliage, and for the great beauty of the clusters of lilac flowers, the long and slender stamens of which stream in the wind and glitter in the sun like a number of silken tassels artificially fastened to the boughs. This species is now commonly cultivated in the warmer parts of Europe. In England it is seen trained against walls, where it succeeds indifferently well, flowering only occasionally so far north as the latitude of London. Its great enemy in this climate seems to be, not our winters, but the want of an intensely hot summer to prevent exuberant growth, and to ripen the shoots so perfectly as to enable them to resist frost.

Acacia decipiens, paradoxical acacia, is remarkable for the blunders to which it has given rise. When botany was only a science of names, its flowerless branches were taken for the leaves of a kind of fern; and at a later period, when botanical geography was as yet unheard of, it was believed to be a native of the north-west coast of North America; an opinion as probable as that would now be considered which referred the origin of a race of blackamoors to Great Britain. It is an inhabitant of the south-west coast of New Holland, where it forms a bush of singular aspect. In this country it is cultivated in the greenhouse, and it flowers in March, April, and May.

Acacia Sophoræ, fragrant acacia, is a native of the south side of New Holland and Van Diemen's Land. In this country it is a very ornamental greenhouse plant, which, if planted in the open border, will grow as high as eight feet. It flowers during all the early months of the year, producing its numerous clusters of sweet yellow blossoms in great profusion. Few plants are more worthy of a permanent station in a good conservatory.

Cultivation. The species of this genus are increased artificially in two different ways. Most of them may be multiplied by cuttings struck in silver sand, placed under a bell-glass, and kept in a warm place, to which no direct solar light has access. Such of them, however, as do not increase with sufficient certainty by this method, *A. Julibrissin*, for instance, have the power of producing shoots from pieces of their root placed in earth in a hot-bed; and by these the nurserymen generally propagate them. Their seeds also are very often received, and from these they can, of course, be multiplied in all cases.

ACA'CIA, PSEUDO. [ROBINIA.]

ACADEMY, from *Academia* (Ἀκαδημία), a garden in the Cerámicus, a suburb of Athens, so called, as it is said, from its original possessor, Académus, who kept there a school for gymnastic exercises. The garden afterwards became the property of Cimon, son of Miltiades, who adorned it with statues, fountains, and groves, and by his will left it to the public. It was one of the favourite haunts of Socrates and his disciples; but the academy owes its celebrity as a seat of philosophy to Plato, who established his school here, over which he presided for nearly half a century. Hence the followers of Plato were called the Academics, and the philosophy of the academy meant the philosophy of Plato. After the revival of letters in Italy, the term Academy came again into use, but with a signification somewhat different. An association of individuals, formed for the cultivation of language and science, and usually endowed by the state, in which it was established, was called by the Latin term Academia. In modern times the name has been applied to learned associations, not for the purposes of instruction, as the Academy of Sciences, at Paris, and Berlin. Its application to common schools of all kinds is an abuse of the term.

ACA'DIA, by the French called ACADIE, is the genuine Indian name of the present province of Nova Scotia. [NOVA SCOTIA.]

ACALE'PHÆ, or Sea-Nettles (from ἀκαλήφη, a nettle), a remarkable class of marine animals, of a gelatinous consistence, and of strange and varied forms. Some are adorned with tints of surpassing loveliness; some shine with phosphorescent brilliance as they float on the surface of the ocean; others glow in its depths like balls of

molten metal or undulations of flame. Some are of large dimensions, others are microscopic; many of the largest, when thrown to perish upon the beach, leave behind, when dried up, nothing more than a slight filmy web, of a few grains in weight; yet some of these will seize and devour fishes of considerable dimensions. Many have the property of producing a stinging sensation in the hand which incautiously touches them. Most exhibit in their substance, or gelatinous texture, a series of distinct tubes ramifying like network, and also a digestive cavity. Some are simple, others are compound. Of their senses it is difficult to speak with precision; but they appear to feel the light, and many know how to avoid obstacles, but no nervous system has been demonstrated. Of their structure, however, we shall speak, in treating of the different orders of this class. These orders are five in number, of which four derive their names from the means of locomotion; but the fifth from the peculiar divided structure of the body, which consists of two parts joined together by a very slender attachment. They are respectively named as follows:—

1. PULMONIGRADA (*pulmo*, a lung; *gradior*, I advance). Example—Rhizostoma, Medusa, &c. 2. CILIOGRADA (*cilium*, a lash or fibril). Example—Beroe, Cydippe, &c. 3. PHYSOGRADA (*φυσάω*, to inflate). Example—Physalia, or the Portuguese Man of War. 4. CIRRHIGRADA (*cirrhus* or *cirrus*, a tentacular appendage). Example—Velella rataria, &c. 5. DIPHYIDA (*δίφυής*, of a double nature). Example—Diphyes, Calpe, &c.

ACANTHA'CEÆ, a tribe of plants forming one of the natural orders in the Monopetalous division of Dicotyledonous or Exogenous Plants. Its name is derived from the genus Acanthus, which has been considered characteristic of the whole tribe. The plants of which it is composed are either altogether of an herbaceous nature, or shrubby in a slight degree only; they are extremely common in every tropical country, where they may be considered to occupy the place of the mints, dead-nettles, thymes, and sages of Europe; a few only are found beyond the limits of the tropics. Many of the species are mere weeds; others bear handsome flowers with gaudy colours, but seldom with any odour; a very small number has been occasionally employed medicinally as emollients or diuretics.

The roots of Acanthaceæ are either annual or perennial. The stems are usually four-cornered when young, but afterwards become nearly round; their inside is occupied by a large proportion of pith, which is enclosed in a thin layer of imperfectly-formed wood; and at each joint there is a slight tumour with an articulation, by which they are readily known from both Scrophularineæ and Verbenaceæ. Their flowers are often inclosed within large leafy imbricated bracteæ. The calyx is usually composed of either four or five parts, which overlap each other, and occasionally grow together at the base. The corolla is monopetalous and irregular. The stamens are either two, or four, but in the latter case are of unequal lengths. The pistillum is superior and turcilled. The seed-vessel contains two cells, which burst when ripe, often with elasticity, and expose a few roundish seeds hanging to the cells by curious hooked processes.

The stems of all the species emit roots very readily from their tumid articulations; on which account gardeners universally increase them by cuttings of the full-grown branches. They are always easy to cultivate, provided they are not kept in too cold or too dry a situation. The annual kinds freely produce seeds, by which they are readily multiplied.

ACA'NTHION, (from *ἄκανθα*, a thorn or prickle. Frederic Cuvier has proposed this term as the generic appellation of certain porcupines (order Rodentia), differing considerably from those of the restricted genus Histrix in the skull. Of these, one species founded upon a skull sent from Java by M. Duvaucel, he has termed *Acanthion Javanicum;* the other, founded upon a skeleton formerly described by Daubenton, but which he erroneously mistook for that of the common species, *Acanthion Daubentonii*. The former of these is probably the Babi-landak of Marsden ('History of Sumatra'). It is represented as having five toes on each foot; the body covered with weak spines, and a long tail terminating in a thick tuft, of which the spines are knotted and opening out of one another like grains of rice. The locality whence Daubenton's skeleton was brought is unknown, but there is reason to believe that it was brought from some part of Africa.

We regard with Fischer the genus Acanthion as synonymous with Cuvier's genus Atherura ('Règne Anim.,' I. p. 215), and it may be observed that the Fasciculated Porcupine (*Atherura fasciculata*, Cuv.; *Histrix fasciculata*, Linn.) is found in Java, Malacca, &c.; and, if the species be identical, also in Fernando Po, where it affords a staple article of food to the inhabitants. Whether this animal be indigenous there or naturalized is doubtful. Fischer gives the Acanthion Javanicum as identical with Atherura fasciculata. Possibly the animal from Fernando Po may be F. Cuvier's Acanthion Daubentonii.

ACANTHODE'RMA, a fossil genus of fishes from Glaris. (Agassiz.)

ACANTHO'DES, a genus of fossil Ganoid fishes, established by M. Agassiz. The species occur in the carboniferous strata near Edinburgh. (Agassiz.)

ACA'NTHOPHIS (from *ἄκανθα*, a thorn, and *ὄφις*, a snake), a genus of venomous snakes allied to the vipers, and termed Acanthophis from the circumstance of the tail terminating in a sort of horny little spine. The plates beneath the tail form a single series, excepting towards the very tip. The head is obtuse, and rather prominent over the eyes; and the scales of the back are rhomboidal. The species are of small size, and inhabit dry places, feeding upon small animals, as mice, frogs, &c. They secrete themselves in holes, or beneath the roots of trees, and are viviparous. Their bite is very dangerous, perhaps indeed always fatal.

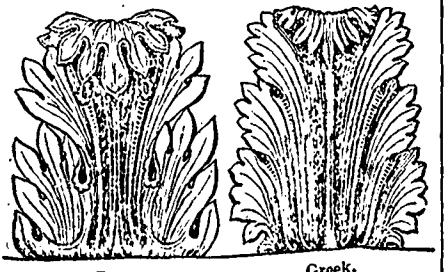
Several species are described, as *Acanthophis cerastinus*, Merrem; *Acanthophis Brownii*,

Leach ('Nat. Miscel.' vol. i.), a native of New Holland; *Acanthophis Tortor*, Lesson ('Zool. de la Coquille'), Australia. The Death-adder, or Tammem, noticed by Mr. G. Bennett ('Wanderings in New South Wales'), is probably identical with the Acanthophis Brownii. It is described as a hideous reptile, thick in proportion to its length. A dog bitten by one died in less than an hour; and Mr. Cunningham states that the head of one which had been separated for more than ten minutes from the body, seized upon the foot of a dog, which soon died in dreadful convulsions; a proof of the vitality of the reptile, and the virulence of its poison.

ACANTHOPTE'RYGII (from ἄκανθα, a thorn, and πτέρυξ, a wing), one of the three primary grand divisions of fishes in Cuvier's arrangement. ('Hist. Nat. des Poissons.') This section includes fishes having bony skeletons, with prickly spinous processes in the dorsal fins, and is divided by Cuvier into fifteen groups or families. As familiar examples of Acanthopterygious fishes, we may mention the perch, the stickleback, the mackerel, the wrasse, the barbel, &c. (Cuvier's 'Règne Animal,' vol. ii. pp. 131 to 269 inclusive.) [ABDOMINALES.]

ACANTHU'RUS (from ἄκανθα, a thorn, and οὐρά, tail), a genus of acanthopterygious fishes, often termed Doctors by English sailors and colonists, because they are armed on each side of the tail with a sharp moveable spine like a lancet, which they use with great effect, inflicting severe wounds on the hands of those who touch them incautiously. Hence the generic title, which means thorn-tail. These dangerous weapons, placed where they can be used with the most advantage (the greatest strength of the fish lying in its tail), render these otherwise harmless fishes capable of defending themselves against the assaults of larger species, to which they are exposed. The body is very deep and much compressed; the teeth are trenchant and denticulated, like a very fine comb; and the dorsal fin is single. Many are remarkable for the beauty and variety of their colours. They are confined to the tropical seas, and are unknown in temperate latitudes. The *acanthurus chirurgiens* (*chaetodon chirurgiens*, Bloch) is a well-known example.

ACANTHUS, in Architecture, the sculptured leaf which is the distinguishing characteristic of



Roman. Greek.

the capital of the Corinthian column. The same leaf, however, is used occasionally in other foliated capitals, as well as for the enrichment of modillions, of mouldings, and of vases. It has been generally supposed that the leaf imitated was that of the *Acanthus mollis*, or Brankursine, but Dr. Sibthorp states that this plant is not found in Greece or the Greek islands, and contends that it was probably the *Acanthus spinosus*, which grows there, and is still called ἄκανθα. This ornament, in the Roman models, is fuller and broader than it is in the Greek.

ACANTHUS. Under this classical name have been described, by ancient authors, at least three totally different plants. Firstly, a prickly tree with smooth evergreen leaves, and small round saffron-coloured berries, frequently alluded to by Virgil; this is conjectured to have been the *Holly*. Secondly, a prickly Egyptian tree, described by Theophrastus as having pods like those of a bean; it is probable that this was the *Acacia Arabica*. [ACACIA]. Thirdly, an herb mentioned by Dioscorides, with broad prickly leaves, which perish at the approach of winter, and again sprout forth with the return of spring. It is said that the idea of the Corinthian capital of Greek columns was taken from some of the leaves of this acanthus. To this latter plant the name is now applied. The word, in all cases, alludes to the prickly nature of the leaves or stems.

In modern botany, Acanthus is a genus of herbaceous plants found in the south of Europe, Asia Minor, and India, belonging to the natural order Acanthaceæ.

A'CANUS, a fossil genus of fishes, from Glaris. (Agassiz.)

ACAPU'LCO, a city in the province of Mexico, about 183 miles S.S.W. from the capital, Mexico, in 16° 50′ N. lat., 99° 48′ W. long. It stands in the recess of a bay, close to a chain of granite mountains, and is the best Mexican port on the coast of the Pacific Ocean. The bay has two entrances formed by the island Roquetta or Grifo: the western entrance is about 280 yards wide; the great entrance from the S. is about a mile and a half wide, with a depth of water from 150 to 210 feet. The port is capable of containing 500 ships, and is deep enough to allow vessels to lie close to the rocks. Acapulco is but poorly built, and is a disagreeable and unhealthy place. Lying within the torrid zone, and surrounded by mountains, it is intensely hot, and the inhabitants, particularly new comers, are liable to dangerous fevers. The city of Mexico, in the interior, communicates with the Pacific by the town of Acapulco, which once had a considerable trade, particularly with Manilla, the capital of Manilla, or Luzon, one of the Philippine islands. Under the Spanish dominion a vessel of the largest size used annually to leave Acapulco for Manilla about February or March, loaded with commodities and specie. The vessel returned to Acapulco in August, carrying back muslins, printed calicoes, coarse cotton shirts, porcelain, Chinese jewellery, &c. Its arrival was the signal for a great concourse of merchants to Acapulco, who swelled the population for the time to about 9000. The monopoly enjoyed by Acapulco while under the dominion of Spain being now abolished, the India

and China trade has shifted to the ports of San Blas, Mazatlan, and Guaymas; and though its prosperity necessarily suffered by such removal, its commerce is said to be again reviving. The present number of inhabitants is stated at about 4000, who are principally people of colour. Its exports are cochineal, indigo, silver, and some skins. (*Dictionnaire Géographique Universel.*)

ACA'RIDES — (Mites, Ticks, &c.) form a division of the ARACHNIDES, or class Arachnida, which also includes spiders and scorpions. All these are separated, on good grounds, from the class INSECTA by modern naturalists. Some of the Acarides are aquatic, others terrestrial; others are fixed upon various animals, whose blood or humours they suck; and others insinuate themselves beneath the skin, where they often multiply prodigiously. Limbs, eight in number, except in one group (*microphthira*), which have only six.

ACARNA'NIA, an ancient division of Northern Greece, which was bounded on the north by the Ambraciot Gulf, now the Gulf of Arta, on the north-east by the small territory of Amphilochia, and on the west and south-west by that part of the Mediterranean to which the Greek and Roman writers gave the name of the Ionian Sea. The eastern boundary is not easy to determine. It extended in the time of Thucydides, who wrote during the Peloponnesian war (which commenced B.C. 431), east of the river Achelous, and encroached upon the territory of the Ætolians. Under the Romans, or somewhat earlier, the Achelous was made the dividing line. Acarnania afterwards became part of the Roman province of Epirus, and Ætolia was attached to the province of Achæa. Acarnania now forms part of the new kingdom of Greece. It has sometimes been called by the name of Carlelia, or Carnia, which appears to be a corruption of the ancient name.

The longest straight line that can be drawn in Acarnania is about fifty miles, from Actium to the mouth of the Achelous. The length of seacoast from Actium, near the entrance of the Ambraciot Gulf to the mouth of the Achelous, is reckoned by Strabo to be about 570 stadia, or 57 miles, reckoning 10 to a mile. Our modern charts give a length of from 70 to 80 miles, measuring in a rough way, along the irregular outline of the coast. There are several good ports found on this coast, which, added to the general fertility of the country, might have made the people wealthy; but the primitive inhabitants never attained any reputation either in commerce or the arts. Their best ports were occupied by Corinthian colonies; and the inhabitants, engaged in continual wars with their neighbours, are characterized by Thucydides as living in a state of piracy and robbery, at a time when Athens (which was not 150 miles from the mouth of the Achelous) had seen the dramas of Æschylus and Sophocles, and was adorned with the great works of Phidias.

In its present condition, Acarnania is very thinly inhabited. It contains a considerable portion of good soil. There are several lakes.

Bordering on Acarnania, on the north-east, was the small territory of Amphilochia, which, with its capital Argos, was sometimes reckoned a part of Acarnania, owing to the political connection between the two people. It lay on the south-east and eastern coast of the Ambraciot Gulf. Amphilochia, together with Acarnania, became part of the Roman province of Epirus.

A'CARUS, a genus of the ACARIDES, termed mites; including, according to Latreille (Cuvier's 'Règne Anim.'), such species as have the *palpi* (or feelers) forked, very short, or concealed. The feet are tipped with a vesicular cushion. As examples, we may notice the domestic mite (*Acarus domesticus*, De Geer), destructive to cabinets of insects and stuffed birds.

The Itch Mite (*Acarus Scabiei*, Fabr.), a microscopic pest found in the pustules of the cutaneous disease called the itch.

The Sparrow Mite (*Acarus passerinus*, Fabr.), distinguished by the size of the third pair of limbs.

ACCELERATED MOTION is such a movement of a point or body that the spaces which it describes in successive equal portions of time are successively greater, or the velocity is continually increasing; and the power which produces such movement is called an accelerating power.

It is a known fact that, when a body falls towards the ground, the motion is uniformly accelerated; that is, whatever be the velocity which it has acquired at the end of the first second of time in its descent, it will have acquired twice as much at the end of two seconds, three times as much at the end of three seconds, and so on; the observed deviations from this law being attributed to the resistance of the air. The law of descent is the same, whatever be the substance of which a falling body is composed, as is manifest from a piece of lead and a feather descending from the top to the bottom of an exhausted receiver in equal times. Near the earth's surface, in the latitude of London, a body descending from a state of rest falls $16\frac{1}{12}$ feet in the first second of time; and, since this space is described with velocities which begin with zero and form an arithmetical progression, consisting of an infinite number of terms differing from one another by unity (the power also which caused the motion being conceived to act constantly and with uniform intensity), it may easily be shown that the velocity acquired at the end of the first second is exactly twice that velocity with which an equal space might be described in an equal time (1 second), by uniform motion: hence, $16\frac{1}{12}$ feet representing that mean velocity, the velocity acquired at the end of one second, is $32\frac{1}{6}$ feet. This number is taken to express the measure of the accelerative force of gravity in the latitude of London, and it is usually represented by g.

It is found that the velocity acquired by a body, in descending from rest, at the end of two seconds is 64.4 feet, at the end of three seconds is 96.6 feet, and so on; that is, the acquired velocities are proportional to the times of motion. It is also found by experiment, and it may be easily shown to be the result of an accelerative force continually acting uniformly, that the space which a body descends from rest, in two seconds is 64.4 feet,

in three seconds is 144.9 feet, and so on; that is, the spaces descended from rest are proportional to the squares of the times; and, t representing the number of seconds, the spaces are represented by $\frac{1}{2}gt$.

If the body has already a certain velocity, a, when it begins to be acted on by the accelerative force of gravity, the space described in a certain time, t, from thence will evidently be expressed by $at + \frac{1}{2}gt^2$, and the velocity acquired at the end of the same time will be $a + gt$.

If a body supposed to be in free space and whose weight is expressed by w, were urged by an accelerating force expressed by some other weight w', the formula expressing the velocity acquired at the end of a given time t, is $g\frac{w't}{w}$, and that which expresses the space described from rest in the same time is $\frac{1}{2}g\frac{w't^2}{w}$.

If a body move uniformly in vacuo with a velocity represented by a, and at a certain instant begin to be acted on by a uniformly retarding force, the velocity at the end of a given time, t, will be expressed by $a - gt$, and the space described in the same time by $at - \frac{1}{2}gt^2$: evidently, therefore, when $a = gt$ the motion will cease; and if the body had been projected vertically upwards, it would, at a time expressed by $\frac{a}{g}\,(= t)$, begin to descend.

In uniformly retarded motions, the formula for the spaces described before the motion ceases is $\frac{v^2 w}{2gw'}$, where v is the given initial velocity, w the weight of the body, and w' the weight which represents the retarding power; and the formula for the time till motion ceases is $\frac{vw}{gw'}\,(= t')$. The space described in a given time, t, when a body is subject to a retarding force, is expressed by the formula $\frac{gw'}{2w}(t' - t)^2$. For variably accelerated or retarded motions, see VELOCITY.

ACCELERATION AND RETARDATION OF TIDES are certain deviations of the times of consecutive high-water at any place, from those which would be observed if the tides occurred after the lapse of a mean interval. The interval between the culmination of the moon, or the occurrence of her principal phases, and the nearest time of high-water is also called the retardation of the tide.

The mean interval between two consecutive lunar tides is half a lunar day or 12h. 25m. 14.16s., while the mean interval between two consecutive solar tides is 12h.; hence if, at the time of a conjunction or opposition of the sun and moon, the high tides which are produced by the action of the luminaries separately were coincident, the next lunar tide would be retarded with respect to the next solar tide by 25m. 14.16s.; these retardations continuing daily, the lunar high-water would coincide at the time of quadrature with the solar low-water, and thus produce the neap or diminished tide; after which, the like retardation continuing, the solar and lunar high-waters would again become coincident at the times of syzygy, and so on. The observed daily retardation of the lunar high-tides varies however according to the position of the moon with respect to the sun, to the moon's declination, and to the distance of that luminary from the earth. At Brest, when the sun and moon are in conjunction or in opposition, at the summer or winter solstice, the retardation is equal to 40m. 51.69s., and at the time of the equinoxes 37m. 38.15s. Again, when the sun and moon are in quadrature at either solstice, the retardation is 67m. 27.49s., and at the time of the equinoxes 83m. 16.34s.

The interval between the instant that the sun passes the meridian of a place and the occurrence of the solar high-tide, is found to be greater than the interval between the transit of the moon and the occurrence of the lunar high-tide; and this acceleration, as it is called, of the lunar with respect to the solar tide, is ascribed to the different velocities which are communicated to the waters by the actions of the sun and moon. It should be observed, however, that local circumstances produce at different ports great differences in the intervals between the culmination of the sun or moon and the time of high-water, even on the days when the luminaries are in conjunction or opposition: at Ipswich, the time of high-water is nearly coincident with the time at which the moon passes the meridian of that port, and at some places the high-tide precedes the transit; but such phenomena are of rare occurrence, and at almost every place the high-tide occurs some time after the moon has culminated.

From a series of observations made at Brest, La Place ascertained that at the syzygies which occur about the vernal and autumnal equinoxes, the highest tides at that port take place 1d. 11.5h. after the instant of the conjunction or opposition; and at the syzygies which occur about the summer and winter solstices, they take place 1d. 13.1h. after the conjunction or opposition: he also ascertained that at the quadratures which occur about the equinoxes the highest tides take place 1d. 12.2h. after the instant of quadrature, and at the solstitial quadratures 1d. 12.3h. after such instant. Sir John Lubbock has determined that the highest tides occur at London, 2d 0h. 19m. after the conjunction or opposition of the sun and moon; and at Liverpool, 1d. 16h. 19m. Dr. Whewell also has found that the highest tides occur at Bristol 1d. 16h. after the syzygies, and at Dundee 1d. 15h. 20m. Mr. Airy has computed, for London, the moon's true hour-angle west of the meridian, at the time of high-water, for every half hour's difference in the time of her transit; and from the table it appears, that when the moon passes the meridian at noon (the time of conjunction) that angle, in time, is 1h. 57m. 17s.; when it passes at 3 P.M., the angle is 1h. 10m. 45s.; at 6 P.M. or at quadrature, 0h. 41m. 17s.; and at 9 P.M., 1h. 55m. 29s. The time first mentioned is called the 'Establishment' at London; but Dr. Whewell recommends that the mean of the times (1h. 25m. 35s.) should be

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used in preference, because it differs less, on any day, from the vulgar establishment.

ACCENT. In modern languages, there is in nearly every word at least one syllable which must be distinguished from the rest by a more impressive utterance, as in the examples, *respéct, respéctful, respéctable.* If the word is a long one, it requires a second accent, as *respéctability, mánufáctory, immórtalize.* On the other hand, when short words come together, one or two are often devoid of accent, as in the phrase *ón the tóp of a hill.* When it is stated that the accented syllable is pronounced more impressively than the rest, it is not meant that all accented syllables are to be equally impressive. In the examples given above, the first accent in *mánufáctory* seems to be weaker than that on the third syllable; so the last accent in *immórtalize,* and that attached to the preposition *on,* among the six monosyllables, *ón the tóp of a hill,* are comparatively very faint. Of the ancient accent, particularly the Greek, it is better to abstain from speaking, because opinions on the subject of Greek accent are both unsettled and contradictory.

The accents of words from time to time are changed, and even variable at the same time. Thus the verb which we call *triumph,* was with Milton generally *triúmph;* the noun and the verb being commonly distinguished by him in the same way as *próduce,* the noun, and *produce,* the verb, are at the present day. Even in our own time, *advertisement* has become *advértisement.* In these changes, the usual tendency in our language is, and has been, to throw the accent farther back from the end of the word. Such a tendency is, perhaps, inherent in all languages, and seems to arise solely from an endeavour to save labour by rapidity of utterance.

The symbols employed to denote accents are three, the acute (´), the grave (`), and the circumflex (^). We have hitherto spoken only of the first. The second, in the ancient languages, is said to denote the opposite to the acute, or perhaps the absence of it; while the circumflex, we are told, marks a compound of the two, first a rising, and then a falling of the voice in the articulation of the same syllable.

These three little marks, as employed in the orthography of the French language, have a signification altogether different. As the French, like all other languages, is deficient in the number of characters used to mark the vowel sounds, it has been found convenient to employ the three symbols given above. Thus, the sounds of *e, é, è,* in the mouth of a Frenchman, differ not so much in point of *accent* as in the real articulation.

Emphasis differs from *accent.* [EMPHASIS.]

ACCENT (in Mathematics). To avoid the confusion arising from the use of many letters in an algebraical problem, and on other accounts, it is customary to signify different magnitudes of the same kind, or magnitudes similarly connected with the question, by the same letter, distinguishing these magnitudes from one another by accents. It is, therefore, to be understood, that the same letter with two different accents, may stand for magnitudes as different in value as those represented by different letters. The convenience of the accent may be illustrated as follows. If *a* men can do *b* things in *c* days, and *e* men can do *f* things in *g* days, we have the following equation:—

$$a f c = e b g.$$

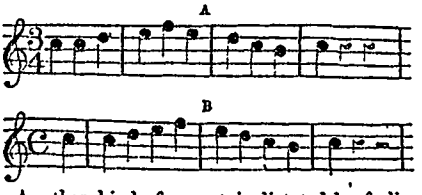
Now, instead of using *e, f,* and *g,* in the second part of the question, let us use the letters which stood for the corresponding quantities in the first part, with accents; that is, let a' men do b' things in c' days. The equation then becomes

$$a b' c = a' b c'.$$

In this new form of the equation some things are evident to the eye, to ascertain which, had the first equation been used, we must have had recourse to the question itself. For instance, that if a'', b'', c'' express men, things, and days, as above, $a b'' c = a'' b c''$, only placing two accents now where there was one before.

The accented letter a' is read *a accented,* or *a dashed;* a'' is read *a twice accented,* or *a twice dashed,* or more conveniently, though without much attention to idiom, *a two dash,* &c.; where accents become too many to be used with convenience, the Roman figures are substituted for them. Thus a^{iv} would be used for a''''. The Roman figures prevent this being taken for a^4.

ACCENT, in music, is the slight emphasis given to notes which are in the accented parts of a bar. In A, for instance, the accent is on the 1st, 4th, and 7th; in B, on the 2nd, 6th, and 10th; and the effects are strikingly different, though the notes are the same.



Another kind of accent is dictated by feeling, and is often required, though the composer may not have marked it by any sign. Commonly however the terms *rinforzata* (strengthened), and *sforzata* (violently forced), are used for the purpose. An acute angle (>) is also employed to indicate such emphasis.

ACCENTED PARTS of a bar, in music, are such as naturally require some emphasis. In common time, the bar of which is divided into four parts, the first and third are accented, the second and fourth unaccented. If the movement is very slow, the accent will fall on the first, third, fifth, and seventh parts. In triple time, the accent is on the first; the second and third are unaccented. All others are modifications of these. [CLEF; TIME.]

ACCEPTANCE, ACCEPTOR. [BILL OF EXCHANGE.]

ACCESSARY (from the low Latin *accessórius*), is one who is guilty of a felony, not as chief actor, but as a participator without being present at the time of the committing of the offence, as by command, advice, instigation, or by concealment, and the like.

A man may be accessary either before the fact, or after it.

An accessary *before the fact* is defined by Lord Hale to be one who, 'being absent at the time of the crime committed, doth yet procure, counsel, or command another to commit a crime.' The mere concealment of a felony intended to be committed, without actual instigation, will not make a man an accessary; that is only a misprision of felony. If a man commands another to commit an unlawful act, he is accessary to all the consequences that may ensue upon it, except such as could not in any reasonable probability be anticipated: for instance, if he commands another violently to beat a third person, and he beats him so that he dies, the person who gives the command is guilty as accessary to the murder consequent upon the act, notwithstanding it may not have been his intention that a murder should be committed. If the directions have been *substantially* pursued, although the crime may not have been committed precisely in the *manner* in which it was commanded to be done, as where a murder is effected by stabbing instead of poisoning, he who gives the directions is an accessary before the fact.

An *accessary after the fact* is one who, knowing that a man has committed a felony, receives, relieves, or assists him. In general, any assistance given to a felon to hinder his being apprehended, tried, or suffering punishment, will constitute the assister an accessary after the fact. Although any *act done* to enable the criminal to escape punishment will make a man guilty as accessary after the fact, a mere omission to apprehend him, without giving positive assistance, will not have that effect. Also, if the crime be not completed at the time of the relief or assistance afforded, the reliever or assister is not adjudged an accessary to it; as where a mortal wound has been given, but the murder is not then completed by the death of the party; yet if the crime is once complete, not even the nearest ties of blood can be pleaded in justification of concealment or relief, except in the case of a wife, who is legally presumed to be so much under the coercion of her husband, that she ought not to be considered as accessary to his crime, by receiving him after it has been committed.

By the statutes of 7 and 8 Geo. IV. c. 29, the punishment of accessaries before the fact is assimilated to that which is inflicted on the principal; and accessaries after the fact are made punishable with imprisonment proportioned to the heinousness of the original crime, but in no case is the imprisonment to exceed two years. The offence of receiving stolen goods is by these statutes specially provided for, and those who are convicted of it are made liable to fourteen years' transportation.

Formerly no accessary could be tried until after the conviction of the principal; but a man may now be tried and convicted either as accessary, or for a distinct felony, without waiting for the conviction of the principal, who may not be within the reach of justice, or who may have been acquitted through accidental failure of evidence.

The distinction between principals and accessaries holds only in cases of felony.

ACCIDENTAL COLOUR is a name given to that which an object appears to have when seen by an eye, strongly affected at the time by some colour different from that which the object really has. Particular cases, in which remarkable accidental colours were formed, appear to have been long since observed; but Buffon was the first who made a series of observations to ascertain the colour of the image of which the mind acquires a perception when the eye has been for a time directed to an object of some particular colour; and it is he who gave the name of accidental colours to those which are so perceived. In a 'Mémoire' which he presented to the Académie des Sciences in 1743, it is stated that when his eye had been, for a certain time, directed steadily to a square spot of one of the following colours—red, yellow, green, blue, and black, the object being placed on a white ground, there was seen about the spot a fringe or border of one of the colours in the following series:—green, blue, pale purple, pale red, and white, each of which, in order, is the accidental colour of the corresponding colour in the former series. Immediately afterwards, on directing his eye to a different part of the white ground, there appeared upon it a square spot of the same accidental colour, the white spot being considerably brighter than the ground. A border of accidental colour is constantly observed about an object when it has been, for a time, viewed intently; and in order that, by rendering it insensible, a coloured object may be seen as distinctly as possible, it is recommended that it be painted or formed on a ground whose natural colour is similar to that of the accidental colour peculiar to the object.

Observations have since been made with coloured spots on grounds of different colours, and from these have been ascertained, at the same time, the accidental colours of the spot and of the ground; for example, on contemplating a red square placed on yellow paper, and then turning the eye to white paper, it is found that the latter is of a blue colour, and that on it appears a square which is coloured green.

Æpinus, after looking attentively at the sun, when near the horizon, closed his eyes, when he observed a round spot with a red margin, the interior being a pale yellow. Afterwards on opening his eyes and looking at a white wall, a spot of the like form appeared on the latter, but the interior was red or brown, and the border a sky-blue. On again closing his eyes the appearances were the same as those first observed; and, on opening them a second time, the form of the spot was still the same, but its colour was green. Continuing thus to shut and open his eyes alternately, the colour of the spot was found to change successively to reddish-green, bluish-green, and blue. These changes in the accidental colours are similar to those which take place in natural colours, when blue in increasing quantities is mixed with yellow; the result being first green and at length blue.

The explanation given by Hassenfratz of acci-

dental colours, in general, is, that the eye being directed to a coloured spot, the part of the retina on which the image of the spot is formed becomes thereby weakened, so as to be in a great measure insensible to the action of rays of that particular colour; and thus, on the eye being afterwards directed to a white ground, it receives sensible impressions only from the rays of the remaining colours in the pencils of white light. There is consequently perceived an image similar in form to the spot on which the eye was first directed, but of a magnitude depending on the distance of the eye from the ground on which it appears, and of a colour which is complementary to that of the spot itself.

ACCIPENSER, a genus of fishes. [STURGEON.]

ACCOLA'DE. This French word, derived from the Latin *ad*, to, and *collum*, the neck, signifies, in familiar speech, an embrace. Some, accordingly, have supposed that, when used as descriptive of a certain part of the ancient ceremony of conferring knighthood, the particular act which it denoted was the *embrace*, accompanied with a kiss, which was bestowed upon the new-made knight, in token of the brotherhood established between them by his admission into the order of chivalry. It has, however, been the more generally-received opinion, that the accolade was what we call in English (though perhaps improperly) the dubbing, the slight blow given to the cheek or shoulder of the knight, 'as an emblem,' to use the language of Gibbon, 'of the last affront which it was lawful for him to endure.' There is no doubt as to the great antiquity of this last-mentioned custom. It has been derived, by some antiquaries, from the blow which the Roman slave received from his master when manumitted, or made a freeman. The blow of liberation, indeed, whatever may have been its original import, may be traced in various directions among the usages of the middle ages.

ACCOMPANIMENT, in Music, is the subordinate part of harmonized compositions. The piano-forte or guitar part of a song is the accompaniment, the air itself being the principal part, the other only the useful ally for support. In a concerto a whole band accompany the instrument for which the chief and prominent part is composed, except in the *tutti* parts, (*i. e.*, those portions of the concerto in which the principal instrument rests,) then the orchestral parts take the form of a full piece.

Accompaniment is also the harmony of a figured base, or another word for what is called *thorough-base*.

The *Accompaniment of the Scale* is the harmony assigned, partly by what may be called nature and partly by custom, to that series of notes denominated the DIATONIC SCALE.

ACCO'RDION, a musical instrument, which was introduced into England from Germany about the year 1828. It is in the form of a small oblong box. The interior exhibits a row of very small elastic metallic springs, fixed at one end in a plate of metal, so that they may vibrate freely. The upper and lower parts of the box are united by a folding apparatus, or bellows, which supplies the air required to put the springs into vibration; and, to these the air is admitted by means of valves acted on by keys, in the manner of an organ. There is also a very simple contrivance by which a base note, or drone, may be added, at the discretion of the performer. These instruments vary in size and in capabilities: the compass of the most complete is from G, the fourth space in the base staff, to E, the seventh additional space above the treble, including all the semitones; and two or more notes can be played at once. The Chinese are known to possess a musical instrument very similar to this.

ACCOUNT or ACCOMPT, is a form of action which in early times was much used for the recovery of money which a person had received and retained, and which it was his duty to hand over to the claimant. At present the action of account is rarely used.

ACCOUNT STATED. This is the title of the common count in an action at law for the amount due upon a balanced account between the parties, the form of which is that the defendant was indebted to the plaintiff in a certain sum of money found to be due from the defendant to the plaintiff upon an account then stated between them, and in consideration thereof promised payment. This form should always be introduced in an action upon a simple contract for the recovery of a pecuniary demand.

Though a member of a copartnership cannot in general sue his copartner at law for his share of the profits, he may do so after an account has been stated between them, and a balance struck in his favour. But it is necessary in all cases of an account stated that there should have existed some claim against the defendant, or some previous transactions in respect of which the account is stated, for an action cannot be brought in this form upon a mere agreement to pay a sum of money. The statement of an account is only presumptive evidence against the party who admits the balance to be against him, and does not preclude him from showing the existence of error in the account; unless in the case of an account actually settled by payment, which cannot be opened except upon proof of fraud.

(Chitty *On Contracts*, 648, et seq., 3rd ed.)

ACCOUNTANT, a person who professes skill in mercantile accounts. In a commercial community occasions are constantly arising for the employment of accountants. They are generally appointed to examine the books of traders who have been compelled by embarrassment in their affairs to summon a meeting of their creditors; or they may be called in by a trader to investigate his accounts, and to ascertain the state of his affairs. The collection of debts or rents, and the winding-up of the affairs of persons deceased, or who have given up business, are matters often put into their hands. Appraisers and auctioneers frequently act as accountants. An accountant has no legal status, like a notary or an auctioneer or appraiser, who perform certain duties which only they are allowed to discharge; but in the Bankrupt Act (5 & 6 Vict. c. 122) official as-

signees must be selected from persons in trade, or who are or have been 'merchants, brokers, or accountants.' The number of persons returned as accountants in the Occupation Census of 1841 was 4974 for Great Britain, of whom 4260 were returned in England: the number in London was 1108.

ACCOUNTANT-GENERAL, an officer of the Court of Chancery, first appointed under 12 Geo. I. c. 32, 'for securing the moneys and effects of the suitors.' The act, sect. 3, enacts, that 'to the end the account between the suitors of the High Court of Chancery and the Bank of England may be the more regularly and plainly kept, and the state of such account may be at all times seen and known,' there shall be 'one person appointed by the High Court of Chancery to act, perform and do all such matters and things relating to the delivering of the suitors' money and effects into the Bank, and taking them out of the Bank, &c., which was formerly done by the Masters and Usher of the Court.' The Accountant-General is 'not to meddle with the suitors' money, but only to keep an account with the Bank.'

The total sum standing in the name of the Accountant-General on the 30th of April, 1841, was 40,957,839*l.*, of which above 39,000,000*l.* was invested in stock, and 1,759,629*l.* was in cash. (*App. to Report on Courts of Law and Equity*, No. 476, Sess. 1842.) The act 5 Vict. c. 5, sect. 63, directs the Accountant-General to cause to be laid before Parliament every year, an account showing the state of the Suitors' Fund and the Suitors' Fee Fund, which stands in his name. The Suitors' Fund consists of money and stock unclaimed, but which are open to claim at any time. On the 1st of October, 1842, this fund amounted to 26,299*l.* cash, and 2,869,213*l.* stock. The Fee Fund accrues from fees formerly payable to the different officers of the court, for their own advantage. These fees amounted to 62,808*l.* in the year ending November, 1842. The salaries of the lord-chancellor, the vice-chancellors, and other officers of the Court of Chancery are paid out of these two funds.

There is an Accountant-General of the Irish Court of Chancery.

ACCUMULATION. An act of Parliament (39 & 40 Geo. III. c. 98), after declaring in the preamble that 'it is expedient that all dispositions of real or personal estates, whereby the profits and produce thereof are directed to be accumulated, or the enjoyment thereof postponed, should be made subject to the restrictions hereinafter contained,' proceeds to enact to the following effect. No person can settle or dispose of property by deed, will, or otherwise, so as to accumulate the income thereof, either wholly or partially, 'for any longer term than the life or lives of any such grantor or grantors, settlor or settlors, or the term of twenty-one years from the death of any such grantor, settlor, devisor, or testator, or during the minority or respective minorities of any person or persons who shall be living or in *ventre sa mere* at the time of the death of such grantor, devisor, or testator, or during the minority or respective minorities only of any person or persons who, under the uses or trusts of the deed, surrender, will, or other assurances directing such accumulations, would for the time being, if of full age, be entitled to the rents, issues, and profits, or the interest, dividends, and annual produce so directed to be accumulated. And in every case where accumulation shall be directed otherwise than as aforesaid, such direction shall be null and void, and the rents, issues, profits, and produce of such property so directed to be accumulated shall, so long as the same shall be directed to be accumulated contrary to the provisions of this act, go to and be received by such person or persons as would have been entitled thereto if such accumulation had not been directed.' Sect. 2 provides, 'that nothing in this act contained shall extend to any provision for payment of debts of any grantor, settlor, or devisor, or other person or persons, or to any provision for raising portions for any child or children of any person taking any interest under any such conveyance, settlement, or devise, or to any direction touching the produce of timber or wood upon any lands or tenements; but that all such provisions shall be made and given as if this act had not passed.' Sect. 3 provides that the act shall not extend to dispositions of heritable property in Scotland.

ACCUMULATION. [CAPITAL.]

ACCUMULATION OF POWER is a term applied to that quantity of motion which exists in some machines at the end of intervals of time, during which the velocity of the moving body has been constantly accelerated.

The simplest case in which there is such an accumulation of power is that of a heavy body, like the rammer of a pile-driving machine, which descends by the action of gravity during a certain time, and impinges upon some object. At the moment of impact, supposing that the object struck does not move, the velocities of all the particles, which had gone on continually increasing during the descent, are destroyed, and thus a shock is produced immensely greater than that which would result from the mere pressure of the body. In all cases, the effect, if measured by the magnitude of an impression or indentation produced in the object struck, is, by the laws of mechanics, directly proportional to the mass in motion, and to the square of the velocity at the instant of impact.

In the coining press, a vast accumulation of force is obtained by means of the fly wheel: the reciprocating motion of a piston connected with a steam-engine communicates, by means of a crank, a continuous circular movement to the fly, and at the same time a reciprocating rectilinear motion vertically to the cylindrical shaft (the stamper) on which the screw is formed. With half a revolution of the fly-wheel the stamper is lifted up, and with the other half it is forced down on the metal, which thus receives at once all the motion accumulated in the fly during an entire revolution.

If the effect of impact at the circumference of a revolving wheel be considered as proportional to the diameter of the wheel and to its mass (supposed

to be collected in its circumference), and it be represented by r w, r being the radius and w the weight of the wheel; then, the effect at a working point when the latter is connected with the axis of revolution at a distance from it, represented by r', being, to the effect at the circumference of the wheel, as r to r'; it will follow that the effect at such working point must vary directly as r^2 w, and inversely as r': hence, it is more advantageous to increase the diameter of the wheel, or its velocity, than its weight. In practice, however, there are certain limits both to the magnitude and the velocity of the wheel, which must not be exceeded, lest the centrifugal force arising from the revolution should destroy the cohesion of the parts.

ACCUSATIVE CASE. [DECLENSION.]

ACER, a name given by the Romans to the tree called Maple by the English. It is now applied to a genus of arborescent or shrubby plants, many of which are extremely valuable, for the sake either of their timber, or of their ornamental appearance. They are for the most part hardy. We shall here enumerate the most remarkable species only.

Acer oblongum, oval-leaved maple, is an evergreen tree, of rapid growth, native of the northern parts of India, both in Nepaul and Kumaon. It is probably confined to the hot valleys of those regions, for it has been found incapable of supporting the climate of England. Its leaves are six or seven inches long, without any divisions, of an ovate figure, tapering into a narrow point; they stand upon slender foot-stalks, and are smooth and glossy above; beneath they are covered with a slight bloom, and are finely netted. The keys are nearly parallel with each other.

Acer lævigatum, the polished maple, is found in the woods of the higher mountains of Nepaul, and also in the mountains of Sirmore, where it acquires a trunk thirty or forty feet high, and from three to four feet thick. Its growth is slow; its timber is said by Dr. Wallich to be used by the inhabitants of Nepaul for rafters, beams, and similar building purposes.

Acer Tataricum, the Tartarian maple, is an ornamental tree, or rather large bush, from fifteen to twenty feet high, often met with in gardens and plantations. Its native countries are the southern provinces of Russia in Asia, whence it extends as far as Hungary, there finding its most western limit. The Calmucs call it *zarza-modon*, or *locust-tree*. From its keys, deprived of their wings, they form, by the aid of boiling water, an astringent beverage, which, mixed with an abundance of milk and butter, forms a favourite article of their diet. The wood is hard and white, mixed with brownish veins.

Acer striatum, the striped-bark maple, is a native of North America, from Canada to the high lands in Georgia. In those countries it forms a considerable part of the undergrowth of the woods, among sugar-maples, beeches, birches, and hemlock-spruce firs. It rarely exceeds eight or ten feet in height, except in a few very favourable situations, when it will occasionally grow double that height. Its wood is very white, and is used by the North Americans for inlaying cabinet-work; its shoots afford food to various animals, especially to the moose-deer, in winter and spring, whence it has acquired the name of *moose-wood*. In Europe it is occasionally seen in plantations, where it is remarkable for the bright rosy tint of its young leaves in spring. When cultivated, it frequently grows to thrice its native size, in consequence of being grafted upon the sycamore maple.

Acer obtusatum, the Neapolitan maple, is a native of Hungary, Croatia, and many parts of Italy. On all the hills and lower mountains of the kingdom of Naples; in Camaldoni, Castellamare, and the Abruzzi, it is found abundantly, growing usually to the height of 40 feet; it is extremely striking, with its reddish-purple branches, in the wood of Lucania, between Rotonda and Rubia; and in the Basilicata and Calabria it is said, by Tenore, to acquire colossal dimensions. It is certainly very singular that so fine a tree as this, occupying so large a tract of country, frequently visited by English tourists, should be almost unknown in this country; and yet, though it is perfectly hardy, and very easily multiplied, it is scarcely ever met with in any but botanical collections. There are two forms of the leaf, one with blunt lobes, and the other with pointed lobes.

Acer campestre, the common maple, is a very common species, found in every hedge-row in England, and spread over the greater part of Europe. It is said not to be indigenous in Scotland; and on the Continent it does not approach the north nearer than the southern provinces of Sweden. It advances as far to the eastward as the range of the Caucasus, where it disappears. In England this is either a bush or a small tree, of inelegant appearance; and its wood is of little value, except for the use of the turner, who makes it into cups, bowls, &c. In the southern region of Caucasus, we are told by Pallas that it becomes a tree of handsome aspect, with a trunk as thick as a man's body, and that its wood is so hard as to be in request for the manufacture of musket-stocks: it must, however, be remarked, that this writer states the keys of his plant to be covered with down; it is therefore to be suspected that the Caucasian plant is distinct from our maple, in which the keys are always smooth. It is much to be wished that this point, which is of some importance, were cleared up. The common maple is sometimes planted by farmers upon bad land, for the purpose of fencing, for which, however, it is ill adapted.

Acer pseudo-plátanus, the sycamore maple. This noble tree is scarcely met with in a truly wild state beyond the limits of middle and southern Europe: it is said to be wild on the edges of the high moors of Northumberland, but this is doubted; it is occasionally seen on the lower ridges of Caucasus, and does not appear to extend much farther eastward. In Italy it is said to arrive at its greatest degree of perfection, acquiring the height of 50 and 60 feet. Its English name has originated in an erroneous notion that this is the sycamore of Scripture—a totally different tree, for an account of which see FICUS. Although the wood of this species is not

particularly valuable, being chiefly used for coarse work, where lightness and toughness are required, yet there is scarcely any more universally cultivated for the sake of the striking effect it produces, whether as a single tree, or planted in avenues, or in masses. It thrives upon poor sandy or gravelly soil, especially near the sea, where few other trees will succeed; and will even bear the smoke of London, although not so well as some others. Many varieties are known to gardeners, of which the following are the most deserving notice:—1. *The Red or Gold-striped.*—Leaves stained with yellow and red. 2. *The Silver-striped.*—Leaves marked with streaks of white. 3. *The Golden.*—Leaves having altogether a yellow tint. 4. *The Corstorphine Plane.*—Distinguished by its broad leaves, and more vigorous mode of growth.

There is also found in the woods of Hungary, near Szánto, what botanists consider a variety, with the lower lobes of the leaves as large as the upper. By some this is called *A. palmifolium.*

Acer Platanoïdes, the Norway maple, is a fine tree, with very handsome glossy deep-green leaves, for the sake of which it is a great deal cultivated. The northern and midland parts of Europe, and the north of Asia, as far as the Ural chain, produce this species. In the Russian empire it passes from the state of a shrub, in the northern provinces, to that of a handsome tree with a trunk two feet thick, in the more southern districts. Its wood is valued for turners' work; from its ascending sap a kind of coarse sugar has been procured, in the same way as from the *A. saccharinum*, in America. Two varieties are known to gardeners; one, *the silver-striped*, in which the leaves are slightly stained with white; and the other, the *cut-leaved*, in which the leaves are deeply and irregularly jagged. When the footstalks of the leaves are broken they exude a milky fluid.

Acer saccharinum, the sugar maple. From a little to the north of Saint Jean, in Canada, to the woods of Upper Virginia, and probably still farther south, this species prevails; and it forms a large portion of the vegetation of New Brunswick, Nova Scotia, Vermont, and New Hampshire, sometimes becoming as much as 80 feet high. In the autumn the woods of those countries are dyed of a crimson hue by the changing leaves of the sugar maple. The wood is hard, and has a satiny lustre, but it is readily attacked by insects, and is not of much value, except when its grain is accidentally waved, and then it is in request for the cabinet-makers. The younger Michaux states, that it may be at all times known from that of the red maple by a very simple test. If you pour a drop or two of the solution of sulphate of iron upon the wood of the sugar maple, in a minute it becomes of a greenish cast, while that of the red maple becomes deep blue. The saccharine matter contained in its ascending sap is the principal cause of this species being in so much request. From this sap, obtained by tapping the trunk in the spring, during the space of six weeks, a very considerable quantity of a fine brown sugar is procured; as much, it is said, as 33lb. per tree. The sugar maple does not generally succeed very well in England, where it is rarely seen, and where, even when in health, it is not more than 15 or 16 feet high.

Cultivation.—The hardy maples, which are the only kinds of any importance in this country, are all increased either by seeds or layers. The European species readily yield their keys, which should be gathered when fully ripe, and immediately buried in heaps of river sand, where they may remain till the following February; they may then be sown in beds, rather thinly, and, when one year old, should be transplanted and treated like other forest trees. They ought never to be headed back, as oaks and Spanish chestnuts are. From layers they all make excellent plants very rapidly. They are occasionally budded upon the common sycamore, but this mode is little practised in England.

ACERATHE'RIUM. Some fossil Rhinocerata have been thus named by Kaup.

ACERI'NEÆ, a tribe of plants comprehending only the maples [ACER] and the ash-leaved maples [NEGUNDO]. They belong to the Polypetalous division of the Dicotyledonous class, and are related to TILIACEÆ, or the Linden tribe: they are also akin to a tribe of tropical plants called MALPIGHIACEÆ. They are known —1, by their flowers being what is called unsymmetrical, that is, not having the various parts agreeing in number: for instance, while the calyx and corolla are divided each into five parts, there are seven, eight, or nine stamens, and three divisions of the pistillum—2, by their stamens being hypogynous, and inserted upon a disk—3, by their winged fruit, or keys—and, 4, by their petals having no appendages upon them. The species are all trees or shrubs, with opposite stalked exstipulate leaves, and are found exclusively in the north of Europe, Asia, America, and India. A sweet mucilaginous sap is common in these plants, from which sugar can be manufactured.

ACERVULA'RIA, a genus of fossil Madrephylliœa.

ACETAL, a compound first called by Döbereiner oxygenated æther. It is formed, together with aldehyde, acetic acid, and acetic æther, by a slow action of alcoholic vapour on precipitated platinum. It is a thin colourless liquid, of a pungent æthereal odour; its density is 0·823, and its boiling point 204°. It is soluble in seven parts of water, and miscible with alcohol in all proportions. It consists of

8 equivalents of carbon	=	48
9 equivalents of hydrogen	=	9
3 equivalents of oxygen	=	24
Equivalent	. .	81

ACETATE, a salt resulting from a combination of acetic acid with an alkaline, earthy, metallic, or vegeto-alkaline base—four varieties which may be exemplified by the acetates of soda, lime, lead, and morphia. Although the acetates possess some properties in common, yet, from the very different nature of their bases, they are variously affected by heat; some being merely evaporated, and others wholly decomposed, at

high temperatures. Some of the metallic acetates, such as that of silver, when subjected to distillation at a high temperature, yield a large portion of acetic acid; while others, such as those of lead and zinc, furnish, besides acetic acid, a peculiar volatile inflammable fluid called pyro-acetic spirit. When metallic acetates are decomposed by heat during distillation, their bases, in some instances, remain in the metallic state, and in others in the form of oxides: the residue in both cases being combined with carbon from the acetic acid. The vegeto-alkaline acetates, such as those of morphia, quina, &c., are decomposed and totally dissipated when exposed to heat in open vessels.

The acetates are a very important class of compounds. Some of them are used in the preparation of acetic acid. The acetate of alumina and the acetate of iron are largely employed by calico-printers; and many of the metallic acetates are used also by them, and by dyers and colour-makers.

ACETIC ACID, or *Acetous Acid*, is the sour part of vinegar, and that to which its peculiar and valuable properties are owing. It is procured, first, by the fermentation of saccharine or sugary matter,—secondly, by the action of heat upon wood; the product of the former constituting *vinegar*, and of the latter *pyroligneous acid*.

1. *Vinegar.* When certain vegetable juices which contain much sugar, such as that of the grape, are fermented, the sugar undergoes the vinous fermentation [FERMENTATION], by which alcohol is produced; and if this process be carried beyond a certain stage, a further fermentation called the acetous fermentation ensues, by which vinegar is produced: so that, in effect, sugar becomes alcohol, and then alcohol becomes vinegar. How this is managed in practice is explained under VINEGAR.

Vinegar (or rather Acetic Acid) possesses the usual property of acids to redden vegetable blue colours; it combines with the alkalis, earths, and metallic oxides to form the salts which are termed *acetates*. Vinegar is purified from the sulphuric acid and colouring matter which it contains by distillation; but its smell and taste are then less agreeable, and it is weaker than acetic acid otherwise procured. When vinegar is exposed to a low temperature, it is principally the watery part which freezes.

2. *Pyroligneous Acid.* The second method of obtaining acetic acid is by heating wood, as the dried branches of trees, in hollow iron cylinders, with a proper arrangement of coolers, or condensers, and receivers. The pyroligneous acid thus procured is of a dark brown colour, has a strong burnt acid smell, is very sour to the taste, and acts strongly on vegetable blue colours. It contains a quantity of tar and oily matter; from these it is purified, in a considerable degree, by redistillation; and a further purification with lime converts it into a pyrolignite of lime. This pyrolignite, by the chemical action of dilute sulphate of soda, produces acetate of soda, which is a crystalline salt. From these crystals pure acetic acid is produced, by exposing them to the action of sulphuric acid, which combines with the soda of the acetate, and leaves the acetic acid free.

The acetic acid thus procured is fluid and colourless, its smell is exceedingly pungent, and its taste very acrid and sour. If applied to the skin it occasions smarting, and even raises blisters. When heated, the vapour which rises from it takes fire if a lighted taper is exposed to it. At about 45° of Fahr. a portion of this acid becomes solid, and shoots into beautiful crystals; and at 60° Fahr. the crystals melt. Acetic acid consists of 3 atoms or equivalents of oxygen, 8 of hydrogen, and 4 of carbon; and its atomic number or combining equivalent is 51. [ATOMIC THEORY.] The crystals are formed of 1 atom acid = 51, and 1 atom water = 9, so that their equivalent is 60.

Acetic acid, in the form of pyroligneous acid, is employed to preserve meat, and to impart to it the smoky flavour usually obtained by drying. Pure acetic acid is used in chemical researches, and especially for preparing various acetates. In a less pure state it is employed in the arts, for preparing acetate or sugar of lead, acetate of copper, or verdigris, and acetate of alumina, which is largely used by calico-printers as a mordant.

ACETONE, *Pyro-acetic Spirit*, is obtained by the decomposition of acetic acid, either from dry acetate of lead, or by passing acetic acid in vapour through a red-hot iron tube. Acetone is a colourless limpid liquid; its odour is peculiar, penetrating, and somewhat aromatic; its specific gravity is 0·792; it boils at 132°, and the density of its vapour is 2·019. It mixes in all proportions with alcohol, æther, and oil of turpentine. It is very inflammable, and is not affected by exposure to the air. It is composed of

3 equivalents of carbon	=	18
3 equivalents of hydrogen	=	3
1 equivalent of oxygen	=	8
Equivalent . .		29

ACHÆA, one of the ancient great divisions of the Peloponnesus, now the Morea, extending from the river Larissus, near Cape Araxus, along the coast of the Corinthian Bay (Gulf of Lepanto), as far east as the small territory of Sicyon, which separated it from that of Corinth. The Sythas, a petty stream, separated Achæa from Sicyonia. The greatest length, in a straight line between the western and eastern boundaries, is about 65 English miles. The breadth of the province varies irregularly from about 12 to 20 miles. Being, for the most part, only a narrow slip between the Arcadian mountains and the sea, the courses of the numerous streams that flow into the Corinthian Gulf are short; and many of them are quite dry in summer.

The province contains many defiles and mountain-passes formed by branches of the great Arcadian ridge, which, in some parts, run down to the Corinthian Gulf. The coast is generally low, and has few good ports.

Before this country was occupied by the Achæi, it was called Ægialos, afterwards Ionia, and sometimes Ægialeian Ionia, which probably means no more than 'Ionia on the sea-coast:' it then contained twelve cities or states. The same number

of political divisions subsisted under the Achæi in the time of Herodotus; at present Patræ, now Patras, situated on the coast, about 6 miles from the entrance of the Gulf of Corinth, is the only Achæan town of any importance.

After the Roman conquest of Greece, the term Achæa comprehended a much larger extent of country. The Roman province of Achæa comprised all Peloponnesus, with Northern Greece south of Thessaly; the rest of Northern Greece belonged to Macedonia. But it is exceedingly difficult to fix the precise limits of the Roman provinces of Macedonia and Achæa. Nicopolis, a town which Augustus built near the northern entrance of the Ambraciot Gulf (Gulf of Arta) to commemorate his victory at Actium, is included in the province of Achæa, in a passage of Tacitus.

ACHÆAN CONFEDERATION or LEAGUE. The Achæans, who formed that federal union which is commonly called the Achæan League, inhabited the tract which lies along the southern coast of the Corinthian Gulf (Gulf of Lepanto). They formed twelve small independent states. The history of the Achæans is an inconsiderable part of the general history of Greece, till about B.C. 251. During the invasion of Greece by the Persians, they took no share in the battles of Marathon, B.C. 490, Salamis, B.C. 480, and Platæa, B.C. 479; nor during the long war of twenty-seven years, did they take anything more than a kind of forced part in this protracted struggle between Athens and Sparta. At the commencement of this war (B.C. 431), they were, with the exception of Pellene, neutral; but afterwards favoured the Lacedæmonian interest, in compliance with the general feeling in the peninsula.

During the struggles of the Southern Greeks against the successors of Alexander, the Achæans wished to remain neutral, but they ultimately became the prey of the Macedonians. Some cities were compelled to receive the garrisons of Demetrius and Cassander, and afterwards those of Antigonus Gonatas, or to submit to tyrants.

Four of the western states of Achæa, Dyme, Patræ, Tritæa, and Pharæ (Polybius, ii. 41), seeing the difficulties in which Antigonus Gonatas, king of Macedonia, was involved, formed a union for mutual protection, B.C. 281. Three other towns afterwards joined the league. In B.C. 251, Aratus having delivered Sicyon, which was not an Achæan town, brought it over to the confederacy, of which he was elected general in B.C. 245. Corinth, Megaris, Epidaurus, and Trœzen, also became members of the league. During the long career of Aratus, other Peloponnesian states were included in the union; and in fact Aratus is called by Polybius the founder of the confederation. In the year B.C. 208, five years after the death of Aratus, Philopœmen was elected general of the confederacy. In 191 Sparta became a member of the Achæan league, and the design of its leaders was to include all the Peloponnesus within its limits. After the death of Philopœmen (B.C. 183) the Roman party, which had been established in Greece after the defeat of Philip V. of Macedonia (B.C. 197), grew still stronger under the influence of Callicrates, and the league remained, in appearance at least, on the side of the Romans in their final struggle with Perseus, king of Macedonia, which ended in the defeat of the king (B.C. 168).

The last war of the league was with Sparta, which was occasioned in B.C. 150, through the influence of Critolaus. This, which the Romans considered as a kind of attack on themselves, joined to the contumacious treatment of some Roman commissioners at Corinth, induced the republic to send L. Mummius to chastise the Achæans. The Achæan general, Diæus, met Mummius on the isthmus of Corinth, and fell an easy prey to the Roman general, who, after the battle, burned Corinth to the ground (B.C. 146). Mummius and ten other senators then changed Greece into the Roman province of Achæa, leaving, however, to certain cities, such as Athens, Delphi, and others, the rank of free towns. Corinth afterwards received a Roman colony.

Each state which belonged to the Achæan league, had equal political rank, retained its internal regulations, and its coins, weights, and measures, though the general government also had its coins, weights, and measures, which were uniform. The ordinary general assemblies were held twice a year, and they deliberated for three days. The general assemblies decided upon all matters which affected the general interest, on war and peace, and made all such regulations as were required for the preservation of the union. At the spring meeting, about the time of the vernal equinox, the public functionaries were chosen; the *stratégos*, or general of the confederation, was there chosen, with the *hipparchus*, or master of the horse, who held the next rank, and ten functionaries called *demiurgi*: there was also a chief priest chosen to superintend the religious affairs of the confederation. This was the time of election, during the life of Aratus at least. In the earlier times of the league they had two strategi and a secretary; but, in B.C. 256, after twenty-five years' experience, it was found that one head was better than two. The strategos was elected for a single year, and appears not to have been re-eligible till he had been one year out of office. But Aratus filled the office of strategos seventeen times in twenty-nine years, and Philopœmen was elected eight times in twenty-four years. The functions of the ten demiurgi are not clearly ascertained.

It may be asked how was the general council composed, particularly after the league comprised within itself so many states? Did the states send deputies? Had they, in fact, a representative government? It is difficult to answer this question, though we are inclined to think that there was no strict system of representation. The short time for discussion, the two yearly meetings, the general character of Greek democracy, as well as most passages in which the congress is spoken of, lead us to infer that this deliberative body consisted of every qualified citizen of the confederate states who chose to attend. It appears that all the citizens of the several states, who were thirty years of age, and rich enough not to carry

on any handicraft in order to get a living, might attend the yearly meeting, speak, and vote.

Though we are so imperfectly acquainted with the federal constitution of the Achæans, and unable to reconstruct it completely from the scanty fragments which remain, we may safely conclude that it was no inefficient union which called forth from Polybius the following commendation: 'Their union is so entire and perfect that they are not only joined together in bonds of friendship and alliance, but even make use of the same laws, the same weights, coins, and measures, the same magistrates, counsellors, and judges: so that the inhabitants of this whole tract of Greece seem in all respects to form but one single city, except only that they are not enclosed within the circuit of the same walls. In every other point, both through the whole republic, and in every separate state, we find the most exact resemblance and conformity.' (Polybius, ii. 37, ed. Bekker, and Hampton's Translation).

The chief authority for the history of the Achæan League, is Polybius, book ii., &c.

ACHÆI. [ACHÆA; ACHÆAN CONFEDERATION; ACHILLES; ÆOLIANS.]

ACHARD, FRANZ KARL, was born at Berlin, April 28, 1754, and died April 20, 1821. He was the author of various works, written in German, on experimental physics, chemistry, and agriculture. In 1780 he published, at Berlin, a work entitled 'Chymisch-Physisehe Schriften,' which contains a great number of experiments on the subject of the adhesion of different bodies to each other.

Achard is however chiefly known for his proposal to extract sugar from beet-root. Another Prussian chemist, Margraff, had discovered the existence of a certain portion of sugar in this root as early as 1747, but deemed his discovery of little practical importance. Achard, on the contrary, described beet-root as 'one of the most bountiful gifts which the divine munificence had awarded to man upon the earth.' The institute of Paris, in 1800, honoured him with a vote of thanks, but reported unfavourably of the practicability of his plan. Napoleon however, in 1812, formed an imperial manufactory at Rambouillet, when the plan of Achard was put in practice, and partly succeeded. Since then the manufacture of sugar from beet-root has been carried on very extensively in France. The manufacture however is a forced one, and therefore of very questionable policy.

ACHELOUS (now *Aspro Potamo*, or *White River*) is the largest stream in Greece Proper. The Achelous rises in the lofty mountain range of Pindus, and, after flowing through a very uneven country, enters the level land of Acarnania. Here it discharges itself into the sea; in ancient times, having near its outlet the town of Œniadæ. Its general course is from north to south, and its length may be from 120 to 140 miles. In the time of Thucydides (B.C. 431) the lower waters of the Achelous were considered as belonging to Acarnania, but at a later period this river formed a boundary between Acarnania and Ætolia. At the mouth of the river are several alluvial islands, which in ancient times were called Echinades. Great changes are supposed to have taken place in the number and position of these in the lapse of ages. Homer speaks of the Echinades as sending troops to Troy: Herodotus observed their alluvial formation: Thucydides speaks of their increasing numbers, and predicts their junction to the main land, but says they were uninhabited in his time.

ACHERON, a small stream of Elis, which runs into the Alpheus. Acheron was also the name of one of the rivers of the realms below, over which the dead were fabled to pass. There was another Acheron in Thesprotis, a part of Epirus: this stream rises in the mountain range of Pindus, forms, in its course, a considerable lake, called Acherusia, and finally enters the sea, forming a bay, called by Strabo Glykys Limen ('Sweet Port'), and now Porto Phanari.

There was a third river called Acheron, in Southern Italy. The name Acherusia was given to the Lucrine lake, or else to the lake of Avernus, in Italy; and the hot springs in the neighbourhood were supposed to be near Pyrophlegethon, or the river of fire, in the infernal regions. On the coast of the Euxine, near Heraclea (Erekli), there was a peninsula called Acherusia, where Hercules is said to have descended to bring up the dog Cerberus.

ACHILLE'A, a genus of plants, consisting of sixty or seventy species, found exclusively in the colder climates of the northern hemisphere. They are all herbaceous perennial weeds, of little importance, except to botanists, and are only seen in cultivation in the collections of the curious.

ACHI'LLES, one of the most celebrated personages of the mythic age of Greece—the hero of the Iliad. He belongs to that intermediate period between truth and fiction, during which it is generally hard to say how much is real—how much imaginary. In the circumstances of his life, however, as they are told by Homer, there is scarcely anything impossible, or even improbable, allowing for a reasonable quantity of poetical embellishment. Beyond Homer's account, however, everything is fabulous. [HOMER.]

The most valuable historical facts relative to Achilles are contained in the following passage of *Homer's Iliad*, book ii. 681, &c., where he is giving a list of the warriors who went to Troy:—'I will now tell of those who inhabited Pelasgic Argos, with Alus, Alope, and Trechis; and those who dwelt in Phthia and Hellas, famed for beautiful women, and were called Myrmidons, and *Hellenes* and *Achæi*; the commander of their fifty ships was Achilles.' From this we learn that there was a people in Thessaly called Achæi, as well as a people in the Peloponnesus; and we see also that the name of Hellenes, afterwards the generic name of the Greek nations, originated, as far back as we can trace it, in the basin of Thessaly.

ACHI'LLES TA'TIUS, a Greek astronomer. There is still extant a fragment of Achilles Tatius, entitled 'An Introduction to the Phænomena of Aratus: it may be seen in the 'Uranologion' of Petavius. (Paris, 1630, folio.) Suidas, the lexi-

cographer, confounds this Achilles Tatius with another of the same name, called by him Achilles Statius, who lived later, and wrote a Greek romance, 'The History of Leucippe and Clitophon,' which is accounted one of the best of the love stories of the Greeks.

The date of the astronomer is uncertain; but for reasons which may be seen in Dr. Smith's 'Classical Biography,' article 'Hypsicles,' it seems probable that he did not write before the beginning of the seventh century.

(See an article on the Greek romances in the *Foreign Quarterly Review*, No. 9.)

ACHILLE'UM, a genus of fossil Spongiadæ, of which two species occur in the cretaceous strata of England. Goldfuss.

ACHI'RI, certain flat-fishes constituting the genus *Achirus*, and allied to the Soles (*Solea*), from which they are distinguished by the absence of pectoral fins. Like the soles, these fishes reside at the bottom of the water, but can dart along on edge with considerable rapidity. They inhabit the warmer seas both of the East and West Indies, and are valued as food. They are divided into two subgenera, one (*Achirus*) having the vertical fins distinct from the tail, the other (*Plagusia*) with these fins uniting to the caudal fin. (Cuvier, 'Règne Animal,' vol. ii. p. 343.) They belong to the order Malacopterygii, and family Subbrachiales. One species, well known to naturalists, is the *Achirus marmoratus*, which inhabits the coasts of the Isle of France; it is of a bluish white, sprinkled with black; the scales are very minute, and the flesh is extremely delicate. There are certain pores at the base of the fin-rays, which exude a milky glutinous fluid.

ACHMITE. [Euchysiderite.]

ACHRAS, a genus of tropical plants belonging to the natural order Sapoteæ. The name strictly belongs to the wild pear, and seems to have the same root as Acacia, Acanthus, and other words indicating something prickly. Linnæus, with a capriciousness too usual with him, gave the name to this West Indian genus, which has nothing whatever in common with the pear.

ACHROMATIC. [Lens.]

ACIDA'SPIS, a genus of fossil Crustacea, of the group of the Trilobites; found in the Wenlock limestone. (Murchison.)

ACIDS. The acids are a numerous and important class of chemical bodies. They are generally sour; usually, but not universally, they have great affinity for water, and are readily soluble in it; they change most vegetable blue colours to red; and they unite readily with most alkalis, and with earthy and metallic oxides. Some are natural, some artificial, and some both; some are gaseous, some liquid, and some solid, at common temperatures; some are transparent, and others coloured; some inodorous, and others pungent; some volatile, and others fixed; so that they vary greatly, except in the qualities first named.

No simple or elementary substance has the properties of an acid, and consequently all acids are compounds of two or more of them. In almost every case one of these elements is either oxygen or hydrogen, producing the *oxacids* and the *hydracids*, the former of which are by far the most numerous. In some instances oxygen gives rise to different acids by combining with the same element in various proportions.

Acids occur in all the kingdoms of nature; the phosphoric acids which exist in bone is of animal origin; the citric and the oxalic acids are products of vegetation; the chromic and the arsenic acid enter into the composition of certain minerals; and many of the acids are derivable from two or more of these sources, and are made by chemical agency.

Although oxygen or hydrogen is present in almost every acid, yet on account of the very different classes of bodies of which they frequently form a part, they are not regarded as acidifying principles: acidity, like form, colour, and other less obvious properties, is to be considered as the result of chemical action and combination, and not as derived from the agency of any peculiar principles. *Oxygen*, or 'acid-making,' for instance, is a name derived from a theory of the last century, which is no longer found to be correct.

All the principal acids are described under the letter of the alphabet to which they respectively belong. It will be seen in those articles, that when the name of an acid ends in *ous*, such as *sulphurous*, it contains less oxygen than when it ends in *ic*, as *sulphuric*; and that the prefixes *hyper* and *hypo*, relate to still wider extremes of oxygenation.

ACONITE, WINTER. [Eranthis.]

ACONITI'NA, a vegetable alkali which exists in *aconite*, in combination with *aconitic acid*. It crystallizes in white grains from a solution in dilute alcohol, and is also often obtained in the state of a vitreous, transparent, compact mass. It is inodorous, but intensely bitter and acrid. It is extremely poisonous; 1-50th of a grain being sufficient to kill a sparrow in a few minutes, and a tenth of a grain instantly. It is very soluble in alcohol and æther, slightly soluble in cold water, unalterable in the air, very fusible, and not volatile. It is employed in medicine, and directions are given for its preparation in the 'London Pharmacopœia.'

ACONI'TUM, a genus of poisonous plants belonging to the natural order Ranunculaceæ. From very early times it has borne the same name, and has been known for the dangerous properties of many of its species. They are all hardy herbaceous plants, many of them of great beauty; and are so easily cultivated, that one of them, *A. Napellus*, is found in every cottager's garden. The English call them *Wolf's-Bane*, which name corresponds with the French *Tue-Loup* (kill-wolf). From all other ranunculaceous plants Aconitum is at once known by its having the very large uppermost segment of its calyx overhanging the petals and other parts in the form of a helmet.

The common species, *A. Napellus*, is one of those in which the greatest degree of virulence has been found to reside.

It is a native of Alpine pastures in Switzerland and other mountainous parts of Europe. Its leaves

are very dark green, deeply cut into from five or seven long segments. The stem is about 3 feet high. The flowers are in long stiff spikes, and of a deep blue colour; they appear from May to July. All the parts of this plant are extremely acrid, especially the roots, which are scraped and mixed with food to form a bait for wolves and other savage animals. According to the observations of Orfila, the juice of the leaves introduced into the stomach occasions death in a short time; the root is far more energetic. The poison acts upon the nervous system, especially the brain, producing a sort of frenzy.

Aconitum Napellus.

These properties are probably found in all the species of the genus. *A. cammarum, lycoctonum,* and *anthora,* are certainly equally dangerous. None of them, however, not *A. Napellus* itself, can be compared for fatal energy with the dreadful *Bikh* or *Bish* of Nepaul, the *Aconitum ferox,* which seems to possess the concentrated power of all the European species.

ACONI'TUM (*Monkshood* or *Wolf's-bane*), *Medical Properties of.* The officinal parts are the root and leaves, but the seeds might be added with propriety. Every part of the plant has a narcotico-acrid property. The live plant has little of the virose repulsive odour common in poisonous vegetables; nevertheless very sensitive individuals, by merely smelling the flowers, have fainted, and had dimness of vision for some days, and handling the fresh plant has occasioned tremblings and faintness. Honey collected from these flowers has caused severe suffering and even death. In making the essential extract, and in procuring the alkaloid Aconitina, the vapours have powerfully affected the operators; hence much care is required on their part. A small piece of the leaf, root, or a single seed, if chewed, causes a feeling of tingling, followed by numbness of the lips and tongue, which lasts for hours. A greater portion causes these sensations in the palate and throat, where in larger or poisonous doses a choking sensation is felt. The resemblance of many aconites, especially before flowering, to several umbelliferous plants in common use, such as celery, lovage, masterwort, &c., proves a frequent source of poisoning by them; a calamity further augmented by the inconsiderate practice of giving ignorant persons portions of the leaves to chew, or as a kind of parsley.

When first introduced into medical practice it was recommended in many diseases; but it is now almost entirely restricted to painful affections of the nerves, and to rheumatic complaints, particularly when they are complicated with syphilis. For nervous affections it is more used externally than internally, but this last mode is to be commended at the same time. An ointment is formed with one or two grains of the aconitina to one drachm of axunge. A small portion of this is to be applied frequently to the part affected. An eruption sometimes appears, especially if the ointment be strong. The internal use of aconitina is scarcely to be advised, one-fiftieth of a grain having endangered the life of an adult. The very high price of this article is an obstacle to its extensive employment; but ingenious chemists are endeavouring to simplify the process of extracting it. To obtain it perfectly pure it is almost essential to use sulphuric æther in the preparation of it, which necessarily increases the expense. The alcoholic tincture or extract is of great service in chronic rheumatism, and even in some cases of acute rheumatism.

Should poisoning occur, attempts must immediately be made to empty the stomach by emetics or the stomach-pump. No brandy or other form of alcohol should be given, nor vinegar, till all the herb is removed from the stomach, after which coffee with vinegar is very useful: venesection may sometimes be required.

ACO'NTIAS (from *ἀκων, ἀκοντος,* a javelin), a genus of snake-like reptiles, belonging to the section *Anguis* of Cuvier ('Règne Anim.' vol. ii. p. 70), but retained by most modern authors within the limits of the Saurian or Lizard group, of which, with many others, it forms a section, intermediate between the true lizards and the true snakes. MM. Dumeril and Bibron place it in the subfamily *Saurophthalmes,* belonging to their eighth or last family of Saurians, which they term *Scincoïdiens, ou Lepidosaures,* ('Suites à Buffon, Erpétologie,' vol. v. p. 801.) The animals of this family are not all footless; but even in such as are so, an imperfect pelvis, a complete sternum, a scapula, and clavicle, are generally concealed beneath the skin: the mouth is small, the tongue fleshy, triangular, covered with papillæ, and but slightly notched at the tip. The eyes, when present, are defended by eyelids, and the body is covered, both above and below, with scales disposed in quincunx order, and not with plates below as in true snakes. The osteology of the skull, moreover, is lacertine in its character.

In the genus *Acontias,* however, the bones of the pelvis and shoulder do not exist; and the eyes are defended only by a single lower eyelid. The form is serpent-like; yet these reptiles do not glide like serpents, but carry their heads and necks erect: they defend themselves boldly,

darting with the velocity of an arrow against their assailant; nevertheless, their habits are gentle, and unless hard pressed they endeavour to escape, and seek safety by concealment. Though reputed venomous, as is their relative the common Slow Worm of our island, by the ignorant, they are not at all dangerous; they possess no poison-fangs, and their teeth are small, conical, and blunt. From the extreme rapidity of their movements, they have obtained the name of javelin or dart snakes. A prettily-mottled species, the *Acontias meleagris*, is found in Southern Africa, and especially at the Cape of Good Hope. The tail is blunt, and the muzzle, which is obtuse, is placed in a single large horny sheath. The food consists of worms and insects, the small and undilateable mouth being unfitted for larger prey. This is the only species admitted by M. Bibron in the genus *Acontias*, as restricted by himself and M. Dumeril.

ACORI'NÆ, ACORI'DEÆ, or ACORA'CEÆ, a small natural order of spadicose Endogens, recently separated from the natural order Avaceæ.

ACORN. [QUERCUS.]

A'CORUS, the botanical name of the plant that produces the drug called in the shops *Calamus aromaticus* It belongs to the natural order Aroideæ, in the acrid properties of which it participates in a slight degree, and is found abundantly in the fresh-water marshes of many parts of England. The leaves when bruised are fragrant; for which reason they were formerly employed to strew the floors of rooms, or of churches, under the name of rushes. This practice is still maintained in some places, where the plant is common, as at Norwich, the cathedral of which city is strewed with sweet rushes upon certain high festivals. The flowers are so seldom produced, that it is a common belief that they are never produced. *Calamus aromaticus* is slightly aromatic, and is occasionally used as a stimulant; but is of very little importance. The part employed is the dried creeping stem, or, as it is improperly called, root.

ACOSTA, JOSEPH D', a Spanish writer of the sixteenth century, was born in Leon, about the year 1539. After finishing his education as a member of the Society of the Jesuits, he became Professor of Theology at Ocaña. In 1571 he was despatched as a missionary to South America, and was eventually made provincial of his order at Peru. During his residence in South America, where he remained till 1588, he wrote an account of that continent, which was published at Seville, in 4to. in 1590, under the title of 'Historia Natural y Moral de las Indias.' This work is highly esteemed as an authority on the early condition of South America. There is an English translation, first published in 1604. Acosta, after his return to his native country, became a great favourite of Philip II., and held successively various dignities. He died in 1600.

ACOTYLE'DONES, or ACOTYLEDO'NEÆ, the name of the first class in Jussieu's Natural System of Botany. It is derived from the circumstance of all the plants which it comprehends vegetating without the aid of the seed-lobes called cotyledons. Such plants are also in all cases destitute of flowers, and are in fact the same as what Linnæus called *Cryptogamous*.

ACOUCHI, a small rodent quadruped. [AGOUTI.]

ACOUSTICS, a word derived from the Greek, and signifying the science of sound. In treating this subject we shall confine ourselves to the elucidation of those first principles, without which the applications cannot be understood; and for more specific information the reader must consult the articles PIPE, CHORD, VIBRATION, HARMONICS, SPEAKING TRUMPET, EAR, LARYNX, ECHO, &c.

Some sounds differ only in intensity, or loudness, as the reports of a cannon and a musket; others, in musical pitch, as two notes of the same instrument; others again, in character, or tone, such as the same note sounded on a flute and a trumpet. This being understood, we proceed to inquire what is the agent in conveying these different sounds to the ear, and how far we can explain the fact, that we can hear and distinguish at the same time almost any number of different sounds.

No body can produce a sound unless its parts be put into rapid motion. We have evidence of this in a tuning-fork, the string of a musical instrument, the parchment of a drum, &c. Neither will any sound be perceived unless there is a continual supply of solid or fluid matter, possessed of a moderate degree of elasticity, between it and the ear. Thus a bell, when rung in an exhausted receiver hardly yields any sound; and the small portion which it does give may be altogether destroyed or materially diminished by lining the receiver with cotton or wool. The air is generally the medium through which sound is conveyed; but only because this is most commonly the one with which the *tympanum* or drum of the ear is in direct communication. A bell rung under water has been very well heard at a distance of 1200 feet, by an observer with his head under the same body of water; those who work in one shaft of a mine can often distinctly hear the sound of the pickaxe in another shaft, through the solid rock; and persons *wholly* deaf, who therefore are *not* at all affected through the ear, have received pleasure from music, by placing their hands upon a shutter, or other solid body near the instruments. We confine ourselves particularly to what takes place in air.

The body of air which surrounds us produces no sound if it be all moved together, that is, if the velocity of all its particles be the same. The highest wind makes no noise except when it is forced against some obstacle; and the sound of a cannon is heard in whatever direction the wind may blow. Neither does the strongest band of music produce any sensible wind in any direction. It is therefore unto some other sort of motion that we must look for the agent of sound, and the manner in which sonorous bodies move immediately points it out. If a tuning-fork or a string be struck, a rapid succession of vibrations is the consequence, which, as we shall see, causes the

particles of air to vibrate in a similar manner. And we find, that in order to produce a note, there must be a *rapid* succession of vibrations; experiments show that the ear is not capable of receiving the impression which we call sound, unless the particles of air in contact with it, vibrate at least thirty times in a second. The vibration produced in the particles of air by a sonorous body may be distinctly proved by the following experiment. Let a tuning-fork be sounded, and while yet in vibration let it be stopped by the finger. A sensation will be felt for an instant, for which we have no name in our language, arising from the prong of the fork rapidly, but gently, striking the finger, and very different from that produced by merely touching the fork when at rest. Now, blow into a common flute, stopping two or three of the higher holes, gently. The same sort of sensation, though in a much smaller degree, will be felt on that part of the fingers' ends which is in communication with the interior air. The fingers should be warm, and if the observer be not used to the instrument, the effect is made more certain by tuning the string of a violoncello to the note which is to be fingered on the flute, and then sounding the former strongly, while the latter is held over it, with the fingers placed as before. That any very violent and sudden noise produces a concussion in the air even farther than the sound can be heard, is proved by the fact, that the explosion of a large powder-mill will shake the windows in their frames for nearly 20 miles round.

We proceed now to describe, very briefly, the motion which takes place in air when the impression of sound is communicated. Suppose a column of air inclosed in a thin tube indefinitely extended in length, and closed at one extremity by a piston which may be moved backwards and forwards alternately through a short space, with successive increases or decreases of velocity; then, on so moving the piston in the tube, the air immediately beyond that space receives successive increases or decreases of compression or rarefaction, and of velocity; and these velocities being transmitted to the next succeeding portions of air in the tube, the parts before compressed or rarefied temporarily, recover their former state. These phenomena continue during one movement of the piston forwards and backwards; and the like will occur as long as such movements of the piston are repeated, a series of compressions and rarefactions being propagated along the tube. The series of compressions is called a *wave of compression*, and a series of rarefactions a *wave of rarefaction*.

If the tube be agitated by several different undulations, all propagated at once in the same direction, the velocities of each particle of air will be made up of the *sum* or the *difference* of those which it would have received from each undulation had each acted alone; the sum when it would have been compressed or rarefied by both, and the difference when it would have been compressed by one and rarefied by the other: and it may be shown that the air moving in the tube is then composed of cycles, or waves, each consisting of a series of compressions and rarefactions. If equal waves in the tubes be propagated in opposite directions, in the same time, arising, for example, from the motions of two pistons at the opposite ends of the tube, it will happen that when the waves meet, the particles will neither be compressed nor rarefied, since the condensations or rarefactions produced by one wave, will be counteracted by the rarefactions or condensations produced by that which moves in the contrary direction; but every particle has the velocity derived from either wave, doubled by the other. Again, there will be nodes or points where the particles undergo no change of place, but merely such condensation or rarefaction as brings them to the general density of the air in the tube; and midway between these, there will be points at which the particles never undergo compression, or rarefaction, but only changes of velocity. Such phenomena take place in a tube which is closed at the end opposite to that at which a piston is applied; the wave advancing along the tube being reflected back in an equal wave meeting it in a contrary direction.

In order to give an indication of the waves produced in every direction in open air, let it be conceived that an elastic sphere is by some internal mechanism suddenly diminished in volume without losing its spherical form, and afterwards as suddenly restored; a wave of rarefaction and condensation will then be propagated in every direction, and at any instant such wave will be contained between the surfaces of two spheres concentric with the sphere first mentioned: the radii of these spheres will differ by the length of the double wave, and it is found by analysis and experiment both, that the velocity of the wave's propagation is uniform, and that the absolute velocities of the particles of air diminish inversely as the distance to which the wave has advanced; thus, if a wave of sound has advanced from 3 to 5 miles, the compressions and the velocities of the particles will, at the two places, be in the ratio of 5 to 3.

Now, when a gun is fired, the elasticity of the gases which are disengaged by igniting the gunpowder forces the air out of the gun, into which the instant afterwards it returns; the intensity of the sound seeming to depend upon the absolute velocity of the particles of air, and not at all on the velocity of propagation, which is the same for all sounds. It would not, however, be correct to say that sound travels with equal loudness in every direction; for if a tuning-fork be sounded and turned round while held near the ear, very perceptible diminutions and augmentations of loudness will be perceived.

The immediate communicator of sound is the tympanum or drum of the ear, an elastic membrane, which is set in vibration by the motion of the particles of air against it, and vibrates in the same time with them. The impression is conveyed to the brain by certain neighbouring nerves. [Ear.] We might expect, that when the wave of sound is of considerable length, we should hear its different parts, that is, feel a difference

between the beginning and end where the velocities and compressions are small, and the middle where they are greatest. This happens to a small extent, in the difference, for example, between the 'roar' of a cannon and the 'report' of a musket. No explanation can convey a better idea of the difference than these two words. These simple uncontinuing sounds are the result of few waves, there being no cause for their continuance.

We have not room in this article for any discussion of the manner in which sounds are conveyed through other bodies besides air, for which see VIBRATION. Noises conveyed through solid bodies travel generally quicker and are heard better; the scratch of a pin may be distinctly perceived through a long spar of wood, though inaudible by the person who makes it. With regard to gases, both theory and experiment agree in enabling us to assert, that any two of the same pressure and temperature (that is, in which the barometer and thermometer would stand at the same height), convey sound with velocities which are inversely as their densities. Thus, air being about thirteen times as heavy as hydrogen, the velocity of propagation in the latter is about thirteen times that in the former. Such a result cannot be directly submitted to experiment; but there are methods equally certain for ascertaining the truth. [PIPE.]

The velocity of sound had been determined by experiment before the time of Newton, who gave the first mathematical solution of the question; and Sir John Herschel has shown, in the 'Treatise on Sound' in the 'Encyclopædia Metropolitana,' that 1125 feet per second at a temperature of the air expressed by 62° Fahrenheit, accords very nearly with a mean of the best experiments. Every increase or decrease of temperature expressed by 1° Fahrenheit causes a corresponding increase or decrease of 1.14 foot in the velocity of sound; which gives about 1090 feet for the velocity when the air is at the freezing point.

When the exciting cause of sound is continued, as, for example, when a board is scratched with a pin, we have a continued sound, caused by the succession of waves which the ear receives, which waves we have no reason to believe are all of the same length. But whenever the exciting cause is one, the vibrations of which can be shown to be performed in exactly the same time, so that the waves caused by them are all of the same length, we perceive a sound which gives pleasure to the ear, and has the name of *harmonious* or *musical*. This, however, only happens when the vibrations are at least thirty in a second, or the wave of a sound at most about 38 feet long. This fact is so well established that we may consider it as certain that the pleasure arising from musical sounds is a consequence of the perfectly equal times of the vibrations which produce them, and of its result, the equal lengths of the sonorous waves propagated from them through the atmosphere.

The difference between two musical sounds, which we express by saying that one is higher or lower than the other, is a consequence of the different number of vibrations performed by the two

in the same time, and the sound which we call *higher* has the greater number of vibrations. And some sounds, when made together, produce an effect utterly unbearable, while others can be tolerated; others again are extremely pleasant, while some, though very different in pitch, appear so alike, that we call them the same, only higher. It is found by experiment that two sounds are more or less *consonant*, when heard together, according as the relation between their vibrations is more or less simple. Thus, when two vibrations of the first are made in one vibration of the second (which is the simplest ratio possible, when the sounds are really different), that similarity is observed to which we have just alluded; the first sound is called the octave of the second, and both are denoted in music by the same letter. When the number of vibrations of the two are as 3 to 2, the one which vibrates three times while the other vibrates two, is called a *fifth* above the other; because in the musical scale of notes the vibrations of C and G are in this proportion, and G is the *fifth* sound reckoned from C. If the ratio of the vibrations be that of 3 to 4, that is, if the higher note makes four vibrations, while the lower note makes three, which is the case with C and its *fourth* F; or that of 4 to 5, which happens with C and its *third* E; the combined effect of the two is agreeable. The same may be said of C and its *sixth* A, in which the ratio is that of 3 to 5, or of E and its *minor sixth* [MUSIC] C¹, in which the ratio is that of 5 to 8; or of E and its *minor third* G, in which the ratio is that of 5 to 6. We write underneath the common musical scale in the treble clef, with the denominations of the notes, and the fraction of a vibration which is completed while the first C completes one vibration, which fraction is greater than unity, as the notes are rising. Thus while C vibrates once, D vibrates once and one-eighth; or 8 vibrations of C take place during 9 of those of D.

	C	D	E	F	G	A	B	C¹	D¹	&c.
𝄞	1	9/8	5/4	4/3	3/2	5/3	15/8	2	9/4	&c.

This is the musical scale pointed out by nature, since all nations have adopted it, or part of it at least. It fully verifies our assertion that the ear delights in the simplest combinations of vibrations. It would be hardly possible to place between 1 and 2, six increasing fractions whose numerators and denominators should, on the whole, contain smaller numbers. We find, in the six intermediate fractions, only 2, 3, 4, and 5 singly, or multiplied by one another, no product exceeding 15. Neither has the whole of this scale always been adopted. It seems to have been formerly universal to reject F and B, the *fourth* and *seventh* of the scale; as is proved by the oldest national airs of the orientals, the northern nations, and even of the Italians. [SCALE.]

We have noticed all the cases which the musicians call *concords*: the remainder, though contributing much to the effect of music, being called *discords*. Thus, if F and G be sounded together, in which F makes 4/3 of a vibration while G makes 3/2, or F makes 8 vibrations while G makes

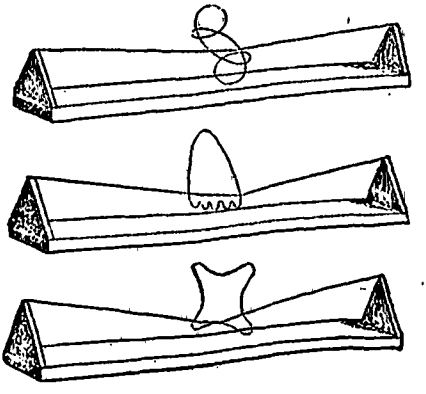
9, the effect is disagreeable, at least if continued for some time. On the piano-forte, in which the notes when struck subside into comparative weakness, this is not so much perceived; but on the organ, in which the notes are sustained, the effect is intolerable, and accompanied by an apparent shaking of the note, producing what are called *beats*, which we shall presently explain. Nevertheless, it becomes endurable, if not too long continued, provided F, the *discordant note*, as it is called, is allowed to pass to the nearest sound, which will make one of the more simple combinations of vibrations with G. The nearest such sound is E, which makes 5 vibrations, while G makes 6. [HARMONY.]

With respect to the absolute number of vibrations made by musical notes, it appears from a mean of the results taken at the orchestras of the theatre at Berlin, and of three opera-houses at Paris, that the middle A of the treble clef, or the A in the preceding table was produced by about 430 waves of sound per second. From this we may form an idea how many vibrations are necessary to create the sensation of a musical sound, and also at what point of the scale the vibrations per second would become so numerous that this effect should cease. Now, the lowest note, or that which though audible as a sound is scarcely distinguishable from the notes nearest to it, is the fourth C descending from this A, and the highest is the fourth C ascending from it: therefore if A in the above table be supposed to make 480 waves per second, and the letters with the corresponding fractions were continued to the left as far as C_3 only (= 32½ waves per second) and to the right as far as c^3 (= 2064 waves per second) it would be evident that the ear receives a musical impression from any sound which arises from a number of vibrations (using round numbers) between 30 and 2000.

The phenomenon of combined sounds called a *beat* may be thus explained. If two notes whose vibrations are nearly in one of the simple ratios above-mentioned be sounded together, the effect of their being out of tune is a tremulous motion of the sound, the pulsations of which can be counted if the notes be not too high. For example, suppose two simultaneous notes whose vibrations are 100 and 104 in a second. Here 25 vibrations of the first are made during 26 of the second; whence, agreeably to what has been above stated, the whole resulting wave is twenty-six times as long as the second wave, and it will run through all its changes *four* times in a second, which is not sufficient to give a musical sound, but will only add to the sound of one of the waves the periodical tremulous sensation called a beat. [TEMPERAMENT.]

It only remains to consider the different character of sounds. The same note, as to *pitch* or tone, may be sounded by a horn and a flute; nevertheless, each instrument has a character of its own, which enables every one to distinguish between the two. It is not to the different loudness of the two, for either, by skilful players, may be made to give the weaker sound; neither does it depend on the number of vibrations, for that, as we have seen, determines only the pitch of the note: the only difference between one wave and another of the same length, is in the different manner in which the air is condensed and rarefied. There is also only this feature left to account for the difference between the tones which different players will draw out of the same instrument; since both Paganini and an itinerant street musician would make the same string vibrate the same number of times in a second. The late Dr. Young, to whom the world is much indebted on this subject, as on almost every other, examined the string of a violin when in motion, and by throwing a beam of light upon it, and marking the motion of the bright spot which it made, he found that the string rarely vibrated in the same plane, but that the middle point would describe various and very complicated curves, corresponding to different manners of drawing the bow. (*Lectures on Nat. Philos.* vol. ii. plate 5.)

We give three specimens, to show how much the vibration produced by one player may differ from that of another. The waves proceeding from all three will be of the same length, the vibrations being performed in the same time; but the condensations and rarefactions will evidently be such as to give very different relative states to contiguous particles of air. The middle of the stretched wire describes the curve on which it is placed, during what we have hitherto called two vibrations.



(Robison's *Mechanical Philosophy*; Biot's *Précis Elémentaire de Physique*; Pouillet's *Traité de Physique*; Sir J. Herschel's article above cited; and ACOUSTICS in the *Penny Cyclopædia*.)

ACQUAPENDENTE, a town in the Papal States, near the confines of Tuscany, in 42° 46′ N. lat., 11° 52′ E. long. It is built on a precipitous mass of rock, over which several pretty cascades, from which the town derives its name, fall into the ravine below. Girolamo Fabrizio, a celebrated anatomist and professor at Padua in the sixteenth century, was a native of this town. It was but an insignificant place until 1650, when Pope Innocent X. having razed to the ground the neighbouring town of Castro, where a bishop had been murdered, transferred the see to Acquapendente. The town is ill-built, dull, and dirty: it belongs to the province of Viterbo, and is 70

miles N.N.W. from Rome. It contains a cathedral, and about 3300 inhabitants.

ACQUI, PROVINCE OF, an administrative division of the Sardinian States, situated on the northern side of the Ligurian Apennines, the ramifications of which run northwards until they slope down into the great valley of the Po. The Bormida, the Belbo, the Erro, and other minor rivers, or rather torrents, which rise in the main ridge of the Apennines, flow between these offsets until they all join the Tanaro, which is the great affluent of the Po on this side. The province of Acqui was formerly called the High or Upper Monferrato, being part of the Marquisate of Monferrato before it was annexed to the dominions of the House of Savoy. The country produces some corn and much fruit. The lower hills are planted with vineyards, from which good wine is made, known at Turin and Genoa by the name of Monferrato wine. The mountains are partly covered with chestnut-trees, which supply an article of common food for the peasantry. The rearing of silkworms is an important branch of industry. A considerable quantity of cattle, especially horned cattle, is bred in the province.

The province of Acqui is bounded on the north by Alessandria, east by Novi, south by Savona, and west by Alba. Its length is about 40 miles north to south, and its greatest breadth is about 25 miles. The population is 92,000 inhabitants, distributed among 73 communes.

The most important towns of the province are —Acqui: Nizza della Paglia, called also Nizza di Monferrato, situated in a pleasant district on the banks of the Belbo, with about 3500 inhabitants: Ovada, a town of 6000 inhabitants, situated among the Ligurian Apennines: Strevi, a small town, known for its good wine. A number of smaller towns and villages, of from 1000 to 2000 inhabitants, are scattered throughout the province.

ACQUI, the chief town of the province of Acqui, is built partly at the foot and partly on the slope of a hill on the left or western bank of the river Bormida. It has a fine old cathedral with a handsome façade, several other churches and convents, a royal college, a clerical seminary, and a town-hall, some other remarkable buildings, and about 7800 inhabitants. It is the see of a bishop. The old walls of the town have been pulled down since the peace of 1815. The old castle stands on a hill outside of the town, and is used as a prison. The town has some manufactories of linen and some tanyards. Acqui is much frequented by invalids from Lombardy and Genoa for its hot sulphur springs; the establishment for bathing is about a quarter of a mile out of the town, on the opposite or right bank of the Bormida. The 'fango,' or mud formed by the sediment of the water, is applied in many cases of local complaints or old wounds, and is considered very efficacious. The town derives its name from its springs, which were known to the Romans by the name of Aquæ Statiellæ, Statielli being the name of a tribe of Ligurians who inhabited this region.

(Casalis, *Dizionario Geografico, Statistico, Commerciale, degli Stati di S. M. il Ré di Sardegna;* Denina, *Quadro dell' Alta Italia;* *Calendario Sardo.*)

ACQUITTAL (from the French *acquitter*, to free or discharge) signifies a deliverance and setting free of a person from a charge of guilt; thus, a man who, upon his trial for a criminal offence is discharged by the jury, is said to be acquitted. The acquittal by the jury has however no legal force until judgment has been given upon the verdict by the court in which the proceedings are instituted.

After judgment of acquittal, if the party be indicted a second time for the same offence, he may plead his former acquittal as a bar or a complete answer to the second charge, and upon such former acquittal being admitted or proved, the person indicted will be entitled to be discharged.

ACQUITTANCE is a discharge in writing of a debt, or sum of money due. A general receipt or acquittance in full of all demands will discharge all debts, except such as are secured by what are termed *specialties*, namely, bonds and instruments under seal; which are considered by the law as of too great force to be discharged by a verbal concord and agreement, or any less formal and solemn acquittance than a deed.

Courts of equity, and even courts of law, will, in some cases, order accounts to be gone into anew, notwithstanding the production of a general acquittance or receipt in full of all demands, upon proof that such acquittance was obtained by fraud or given under a mistake, and that the debt or other demand has not been in fact satisfied.

ACRE, a measure of land, of different value in the different parts of the United Kingdom. When mentioned generally, the statute or English acre is to be understood. A square whose side is 22 yards long is the tenth part of an acre, which therefore contains 22 × 22 × 10, or 4840 square yards. The chain with which land is measured is 22 yards long; so that ten square chains are one acre. This measure is divided into 4 roods, each rood into 40 perches, so that each perch contains 30¼ square yards. Thus:—

Acre.		Rood.		Perch.		Square yards.	Side of equivalent squares in yards.
1	=	4	=	160	=	4840	69.5701
		1	=	40	=	1210	34.7851
				1	=	30¼	5.5

The Irish acre is larger than the English, 121 Irish acres being very nearly equivalent to 196 English acres. The Scottish acre is also larger than the English, 48 Scottish acres being equal to 61 English acres. The English statute acre is used in the United States of North America.

The *Arpent* is the French square measure which most nearly corresponds with the English acre, an arpent containing 4028.9 square yards.

ACRE, ST. JEAN D', a town on the coast of Syria, in 32° 54′ N. lat., 35° 4′ E. long.; it is built on a small promontory, which, with Mount Carmel lying to the south, forms a circular bay. It was called Ptolemais during the sovereignty of the Greeks in Syria; its ancient name was Acco, which was revived after it fell into the hands of the Saracens. Acre is well known in

the history of the Crusades, having been taken in 1191 by Philip Augustus of France, and Richard I. of England. It was for some time in the possession of the Knights of Malta, by whom it was strongly fortified. After 1291 it fell into the hands of the Egyptians, and in 1517 it was taken by the Turks. Acre was in a very ruinous condition in the middle of the seventeenth century, but it has since been improved, and is now said to contain about 15,000 inhabitants. The streets of Acre are narrow, and the houses, which are of stone, have flat roofs. The port is small and not deep, yet it is one of the best along this coast. Europeans carry to Acre cloth, lead, tin, &c., and receive in exchange some cotton and rice. Bonaparte attempted to storm the place in the spring of 1799. The obstinate defence of the garrison commanded by Jezzar Pasha, and aided by Sir Sidney Smith with English sailors, saved Acre from his repeated assaults, and after spending sixty-one days before it, and losing 3000 men, he retreated to Egypt. Acre was taken by Ibrahim Pasha, son of Mehemet Ali, Pasha of Egypt, from the Sultan of Constantinople, his master, on the 27th of May, 1832. In 1840, it was taken by the united English and Austrian squadrons, after a bombardment, which was short, but so effective as to form one of the most memorable events in modern warfare. Great Britain and her allies, Austria, Prussia, Russia, and Turkey, having concluded a treaty at London on the 15th of July, 1840, for the purpose of driving the Egyptian troops out of Syria, and restoring this country to the Sultan, a combined English and Austrian fleet attacked and took the Syrian seaports. On the 2nd of November, 1840, this fleet arrived off Acre: it was commanded by Admiral Sir Robert Stopford, under whom Sir Charles Napier acted as commodore of the English squadron; whilst two Austrian frigates were respectively commanded by the admiral, the Marquis de Bandeira, and by Captain the Archduke Frederick of Austria. The attack began on the following day, the 3rd of November. After a heavy firing of two hours, which was well answered by the Egyptians, the grand magazine blew up with a tremendous explosion, probably ignited by a shell from one of the English war-steamers. Two regiments of infantry, which were standing in battle array near it, were annihilated, as well as every living creature within an area of 60,000 square feet. The Egyptian commandant nevertheless continued to defend the town, but the fire of the ships was so effective that it was discontinued at sunset, and the admiral prepared for a storm on the following day. This, however, the commandant did not await, but evacuated the fortress during the night of the 3rd of November. On the 4th the Anglo-Austrian force took possession of Acre. After the fall of this bulwark of Syria, Ibrahim Pasha evacuated that country and retired to Egypt. Acre has since been restored to the Turks.

ACRE or *Akka* is also the name of one of the Syrian Eyalets, which is described under SYRIA.

ACROCHO'RDUS (from Ἀκροχορδών, a wart), a genus of serpents, discovered in Java, by the traveller Hornstedt, Member of the Stockholm Academy of Sciences, in 1787, of which one species, the *Acrochordus Javanicus*, has been described by various authors (Lacépède, Leschenault, and others).

This genus is remarkable for the warty appearance of the skin, caused by the arrangement of the scales, which are minute, separate from one another, and marked each with three small ridges. These, when the skin is inflated, assume the appearance of granulations. The head is flat, and covered with small scales; the mouth is provided with a double row of small sharp teeth: there are no poison fangs. The throat is capable of enormous dilatation. For observations on some of the bones of the head, see Cuvier's 'Règne Animal,' vol. ii. p. 86, note. The tongue is short and thick; the mouth contracted, and the under jaw shorter and broader than the upper. The Acrochordus Javanicus is not a poisonous serpent, though some have supposed it to be so. It averages from 6 to 10 feet in length, and is of a peculiar form, the body increasing in thickness from the neck to the base of the tail; the tail, on the contrary, is not only short, but abruptly slender. A female caught in a plantation of pepper trees, and opened by Hornstedt, was found to contain five young ones, perfectly formed; whence it would appear that it is viviparous. The stomach contained a quantity of half-digested fruit; and this snake is stated to live upon vegetable matters—a singular circumstance if proved to be true; yet not without analogies among tortoises, lizards, and fishes. The native of China who accompanied Hornstedt cooked and ate the flesh of the specimen alluded to, and reported it to be most delicious. That a non-venomous serpent should be viviparous is not less extraordinary than that a serpent should be frugivorous.

ACROCU'LIA, a fossil genus of Gasteropoda, allied to the Neritadæ. It occurs in Palæozoic strata. (Phillips.)

A'CRODUS, a genus of fossil Placoid fishes, established by M. Agassiz. The species occur almost exclusively in the lias and oolite. One British species (A. minimus) is referred to the keuper series by M. Agassiz. It occurs at Aust Cliff in the bone-bed. The others abound at Lyme Regis, Bath, and Stonesfield.

ACRO'GASTER, a fossil genus of fishes. (Agassiz.)

ACRO'GNATHUS, a genus of fossil Cycloid fishes, found in the chalk of Sussex. (Agassiz.)

ACRO'LEPIS, a genus of fossil Ganoid fishes, found in the magnesian limestone of Durham. (Agassiz.)

ACRO'NYCHAL, from the Greek ἀκρόνυχος, a word used in reference to the rising or setting of the stars. A star is acronychal or rises acronychally when it rises at or very near sunset, and consequently sets at or near sunrise.

ACRO'POLIS (Ἀκρόπολις), a Greek compound word signifying 'the highest point of a city.' It was used to denote some hill, rock, or natural elevation, such as we find forming part of the sites of many ancient cities in Greece. The term Acropolis is now most commonly applied to the rocky eminence of Athens, on which the remains of the

Parthenon stand; but this is only a limited use of the word. Corinth had an acropolis called Acro-Corinthus. An eminence close upon the modern Argos, in the Peloponnesus, was the acropolis of the ancient Argos. The acropolis of Messene in the Morea, situated on Mount Ithome, is another remarkable specimen of these natural bulwarks which were once fortified according to the principles of Greek military science.

(Leake's *Morea; Plan of Athens*, published by the Useful Knowledge Society.)

ACROSALE'NIA, a genus of fossil Echinodermata. (Agassiz.) It occurs in the Isle of Sheppy. (Bowerbank.)

ACROSTIC, a Greek term, properly acrostich (from ἄκρος, the tip or end, στίχος, a line or verse), signifies the beginning of a line or verse. An acrostic is a number of verses so contrived that the first letters of each being read in the order in which they stand, form some name or other word. Addison, who notices this along with other sorts of false wit, in his lively papers on that subject in the 'Spectator,' says, 'There are compound acrostics, where the principal letters stand two or three deep. I have seen some of them, where the verses have not only been edged by a name at each extremity, but have had the same name running down like a seam through the middle of the poem.' There are even instances of the same name being five times repeated in so many successive columns. This species of elaborate trifling was extremely fashionable among the early French poets, from the age of Francis I. down to that of Louis XIV. Some of our English poets of considerable eminence also used formerly to amuse themselves in the same way.

ACROTE'MNUS, a genus of fossil Ganoid fishes. A. faba is found in the chalk of Sussex. (Agassiz.)

ACROTE'RION, a Greek term, signifying 'the extremity of anything.' It is used technically to designate the statue or other ornament on the summit or upper angle, and is sometimes applied also to the similar ornaments over the feet or lower angles, of a pediment; in the latter case, they are all included under the plural *Acroteria*.

ACT. This word is a form of the Latin *actum*, from the verb *agere*, which is used generally to express the doing of any act. The Latin word *actio*, from which our word action is derived, had, among other significations, various legal meanings. Of these meanings, one of the most common was the proceeding by which a man pursued a claim in a court of justice, who was accordingly in such case called the actor. In this sense we have in our language the expression action at law. The word act, a thing done, is sometimes used to express an act or proceeding of a public nature, of which sense the most signal instance among us is the term Act of Parliament, which means an act in which the three component parts of the sovereign power in this country, King, Lords, and Commons, unite; in other words, a law properly so called. The word act is also sometimes applied to denote the record of the fact; and by the expression Act of Parliament, is now generally understood the record of an Act of Parliament, or the written record of a law. This meaning of the word act or acts is derived from the Romans, among whom *acta* signified the records of proceedings, and especially public registers and protocols in which the acts and decrees of the public bodies or functionaries were entered, as Acta Principum, Senatus, Magistratuum. The Acta Publica or Diurna, or Acta Urbis, was a kind of Roman newspaper. [ACTA DIURNA.]

ACT (in the Drama), that portion of a play which is separated from the rest by an interval, during which the stage is left empty. Among the Greeks the stage was never left empty from the beginning to the end of the performance; when the other actors retired, those forming the chorus still remained, and continued the business of the play by the lyrical compositions, which, it is important to observe, were in general essential parts of their drama. From this constitution of the Greek drama, it naturally followed, that the real duration of the action of any play could not well be supposed greatly to exceed that of its theatrical representation. What has been called the Unity of Time became a principle almost invariably observed. On the Roman stage there was no chorus, and the play was divided into acts, as on our own; but the employment of this division amongst the Roman dramatists varied. Plautus often supposes a considerable portion of time to pass between the close of one act and the opening of another. Terence has not availed himself of this liberty. By modern dramatists, however, the practice of dividing a play into acts has generally been taken advantage of to extend the time of the story greatly beyond the space to which it was necessary to confine it on the Greek stage. The division into acts is really that distinction of the modern drama which more than anything else gives to it its peculiar character. Dr. Johnson has observed of modern plays, 'The time required by the fable elapses, for the most part, between the acts; for of so much of the action as is represented, the real and poetical duration is the same.'

Although the French dramatic writers have adhered to the principle of leaving the stage empty only at the end of an act, many of the English dramatists have followed a different practice. In Shakspere particularly, every successive scene uniformly presents a new set of characters, and most commonly a change of place also. He rarely interrupts the action, however, for any considerable space, except during the interval between two acts; but here he does not hesitate to pass over any length of time he may find convenient. The old English Mysteries and Moralities, the first produce of our national dramatic genius, were long destitute of any division either into scenes or acts.

ACT OF PARLIAMENT. [ACT; STATUTE.]

ACT is an exercise performed by students before they are admitted to their degrees. In the University of Oxford it has almost fallen into disuse, and in Dublin is a mere form; but at Cambridge it is still preserved as a preliminary test of the comparative merits of the candidates for the

degree of Bachelor of Arts who aspire to university honours. It is also performed by candidates for the degrees in law, physic, or divinity. The student proposes certain questions connected with his subject to the presiding officer of the *schools* (the place in which acts are kept), who thereupon nominates other students to oppose them. The discussion is carried on syllogistically and in Latin, and terminates by the presiding officer questioning the *respondent*, or the person who is said to 'keep the act,' and his *opponents*, and dismissing them with a short compliment to each, in proportion to his deserts.

ACTA DIURNA ('proceedings of the day') was the title of a gazette, to use the nearest modern term, drawn up and published daily at Rome, both under the republic and the empire. It appears to have contained an abstract of the proceedings of the public assemblies, of the law courts, of the punishment of offenders, an account of any public buildings or other works in progress, together with a list of births, deaths, marriages, divorces, and the like. Until the first consulship of Julius Cæsar, the proceedings of the senate were not published; but Cæsar made provision for giving the same publicity to all the proceedings of the senate which already existed for the popular assemblies. (Suetonius, 'Life of J. Cæsar,' c. 20.) Under Augustus, this rule was repealed. The Acta of the senate, though still registered, were no longer published; and, as all the popular assemblies were now deprived of real authority, the Acta Diurna henceforward can have had little political interest. Even in its best days this state gazette was, no doubt, an extremely meagre document, and yet the Acta Diurna were often consulted and appealed to by the historians of after times, as documents of the highest authority. (Lipsius, in his *Excursus* on the *Annals* of Tacitus, lib. v. c. 4.)

ACTA ERUDITO'RUM, one of the oldest and most celebrated literary and scientific journals. It began to be published at Leipzig in January, 1682, under the conduct of the learned Otto Mencke, one of the professors of the university, assisted by several of his brother professors, and especially by Carpzov (Morhof, 'Polyhistor,' i. 178. edit. 1747.) The numbers, which were in 4to, appeared once a month. On the death of the original editor, in the beginning of 1707, the management of the journal was undertaken by his son, John Burchard Mencke, on whose death in 1732, the charge devolved on his son, Frederic Otto, who was succeeded by other editors. The volume for 1776 was not published till April, 1782, and it was the last. The Acta Eruditorum was the earliest critical journal published in Latin, and it did not confine itself to reviews of books, but inserted also accounts of scientific discoveries, and of the general progress of mathematical and physical science. It was here that Leibnitz, who was a frequent contributor in the early period of the work, first announced his method of the differential calculus. In the hands of its early editors it was admirably conducted. After the first fifty volumes, coming down to the end of 1731, the journal was named 'Nova Acta' or the New Acts. The first series, besides the fifty regular volumes, consists of ten supplementary volumes. Occasionally supplements also appeared in the course of the new series, which, with several volumes of indices, make the complete work amount to 117 volumes.

Many other journals, established in imitation of that of Leipzig, also assumed the name of Acta: the 'Deutsche (or German) Acta Eruditorum,' begun to be published in 8vo, at Leipzig, in 1712, and it was continued till 1740, the whole forming twenty volumes; the 'Fränkische Acta Erudita et Curiosa,' a journal of French literature, published at Nürnberg, from 1726 till 1732; and the 'Deutsche Acta Literaria,' which began at Leipzig in 1715, but did not last above a year or two.

ACTA SANCTORUM. [BOLLANDUS.]

ACTÆ'A. Under the name of ἄκτη, the Greeks described a medicinal plant, which the moderns have ascertained to be what is now called *Sambucus ebulus*. [SAMBUCUS.] Linnæus applied the name to a genus of perennial herbaceous plants found in various parts of Europe, the north of Asia, and America, belonging to the natural order Ranunculaceæ, and only in a slight degree resembling the species intended by classical authors.

One species, *Actæa spicata*, a common European plant, is found occasionally in the north of Yorkshire among bushes; it is properly called Black Baneberry, and also Herb Christopher. It has purplish-black juicy fruits, which would be dangerous, from their tempting appearance, if the fetid odour of the leaves did not prevent their being touched.

ACTI'NIA, a genus of marine animals forming, according to Cuvier, the first order of Polypes, under the fourth class of Zoophites, ('Règne Animal,' vol. iii. pp. 289, 290). He terms them Fleshy Polypes. They constitute the Zoantharia of M. de Blainville, and the Zoophyta helianthoïdea of Dr. Johnson. They are commonly termed Sea Anemonies.

In these animals the body is regular, flower-shaped, more or less elongated and very contractile, with a sac-shaped digestive apparatus, the oval orifice being surrounded by tentacles variously shaped and tubular. Some are fixed, others are free. In many species the base of the body acts as a sucker by means of which they adhere to rocks, stones, &c., while the opposite extremity presents a disc with a central orifice; this is surrounded by tentacles, either in a single row or in several rows, capable of being moved in various directions, elongated or contracted; they are in fact the arms by which the voracious animal seizes its prey and drags it to the mouth. When waiting for its victim, some mollusk or unfortunate little crab, these arms are expanded like the petals of a flower, and being tinted with brilliant colours present an elegant appearance. The actinia seizes animals with which it might appear incapable of contending, and engulphs them, distending itself to a great degree, but digestion is very rapid, and the shells and harder parts of the victims are disgorged when the soft parts are con-

sumed. The external tunic of the body presents both longitudinal and transverse muscular fibres covered with a mucous layer; and nervous fibres have been detected. (Professor Jones, 'Outline of Anim. Kingd.' p. 43.) The sensibility of these creatures is extreme; they contract even when a dark cloud passes over them; and certain species which live in the sand of the shore (*actinia senilis* and *coriacea*) will disgorge water and rapidly bury themselves on the approach of footsteps: yet such is their tenacity of life and their vital energy that when cut transversely asunder each part will become a perfect and distinct individual. The tubular tentacles have each an orifice at the extremity, and they communicate with a compartment between the stomach and muscular tunic, partially divided by vertical laminæ. This compartment may be regarded as the aërating receptacle, and is filled with sea-water taken in and rejected through the tubes at pleasure. In these aërating chambers are the eggs or gemmules, arranged in clusters on a delicate membrane; they escape either through minute orifices into the stomach and so are expelled, or they pass out through the tubes of the tentacles. On our coasts the actinia may be seen at low water clustered upon rocks and masses of stone, which they cover as if with flowers: there they tenaciously adhere by their base, but are nevertheless capable of moving from one spot to another, and in winter they seek deeper water where the changes of temperature do not affect them; it is during the summer consequently that they are chiefly to be observed. On our southern shores the purple sea anemone (*A. equina*) is very common; and two species, the *A. coriacea* and *A. senilis*, tenant the sands, in which, when alarmed, they bury themselves with great promptitude. One species on the Mediterranean (*A. Jordaica*) is esteemed a delicacy by the Italians.

(Ellis, in *Phil. Trans.* vol. lvii; Cuvier; Diquemare, in *Trans. Philosophiques*, and the *Journal de Physique;* Hughes' *Natural History of Barbadoes; Pict. Museum of Nat. Hist.*, vol. ii. p. 415. et seq.)

ACTI'NOCAMAX, a division of Belemnites, proposed by the late Mr. Miller of Bristol, upon the supposition that the species which he ranked in it had no true alveolar cavity or phragmacone. The correctness of this view is doubtful. The species belong to the cretaceous strata. [BELEMNITE.]

ACTINO'CERAS, a genus of fossil Cephalopoda, separated from Orthoceras by Mr. Stokes. The species belong to Palæozoic strata. A. Simmsii occurs in Ireland.

ACTINOCRINI'TES, a genus of Crinoidea [ENCRINITES], containing many species. It occurs in Silurian and carboniferous strata. (Miller.)

ACTI'NOLITE, a crystallized mineral of a green colour, a variety of hornblende, found in primary stratified rocks, and occasionally in trap-rocks. The name is derived from ἀκτίν (*actin*), a ray of light, and λίθος (*lithos*), a stone, from the crystals being arranged in the form of rays.

ACTINO'METER (from ακτίν, a sunbeam; and μετρον, a measure) is an instrument employed for the purpose of ascertaining the intensity of heat in the direct rays of the sun. It consists of a hollow cylinder of glass which is united at one end to a thermometer-tube, the latter being terminated at the upper extremity by a ball which is drawn to a point and broken off so as to leave a very small orifice, which is stopped up with wax: to this tube a graduated scale is applied. The other end of the cylinder is closed by a metal cap furnished with a screw which turns tightly in a collar of leather; the cylinder is filled with ammonic sulphate of copper (a deep blue fluid), and is inclosed in a box which is blackened on three sides, interiorly: the box has a thick glass in front, and the use of the screw is to diminish or increase the capacity of the cylinder if necessary. The instrument was invented by sir John Herschel, who gave a description of it in the *Edinburgh Journal of Science* for 1825.

In making the observations, the instrument is disposed so that the sun may shine on its glass face, when the liquid will mount rapidly in the thermometer-tube: at the end of three or four minutes the extremity of the liquid is brought to the zero of the scale by turning the screw; after which, at the end of one minute, two minutes and three minutes, the observer registers the number of the graduation corresponding to the top of the column of fluid as it continues to rise. The instrument being then covered with a screen, three observations are made as before, at intervals of one minute, as the liquid descends in the tube. It is again placed so that the sun may shine upon it, and afterwards in the shade, when two other sets of observations are made, and so on.

A mean of the two differences between the readings at two nearest observations while the sun shone on the instrument, added to the difference between the readings at the intermediate observations while the instrument was in the shade, is taken as a measure of the intensity of the sun's radiation at the middle time between the first and third observations; and a mean of such results for all the triplets of observations is considered as the general mean.

The length of a degree on the thermometric scale is at present arbitrary, and the relative values of the degrees on the scales of different instruments are determined by comparing together the indications made in like circumstances. Sir J. Herschel proposed to establish, as a unit for the intensity of solar heat, that value which would, in one minute of time, dissolve a thickness equal to ·00039 inch of a horizontal sheet of ice when the sun's light falls vertically upon it. This he calls an *actine;* and, from experiments made by him at the Cape of Good Hope, he determined the value of a degree on the scale of one of his actinometers to be equivalent to 6.093 actines.

The actinometer is highly useful in determining the quantity of solar heat which is absorbed in passing through different strata of the atmosphere, for which purpose the observations must be made at stations differently elevated above the general surface of the earth or sea. It may also be employed to determine the diminution of heat which takes place during eclipses of the sun.

ACTION is a Roman term (*actio*), and signifies the legal process by which a man claims possession of some specific thing to which he has a right, or claims some use or profit in a thing, or requires another to do something which he has agreed to do, or to make pecuniary compensation for neglecting to perform his contract; or by which he claims pecuniary satisfaction for some illegal act of another to his person or property, and sometimes for negligence or omission to do certain acts.

The Roman Actio in Rem, was the action in which a man claimed a thing from another as his property, or some use of a thing; and the action might be against any person who disputed his right. The Roman Actio in Personam was against some determinate person, who made himself liable to the action by not performing his contract, or by doing some illegal act to another man's person or his property. (Gaius, iv. 1.; *Instit.* iv. tit. 6.)

A right of action is either founded on a subsisting right, which becomes a right of action when that right is disputed or not acknowledged by the person or persons whose duty it is to respect and acknowledge it; or it arises from some injury, which gives a right of action to the injured person against him who has done the injury. A right of action which is founded on a subsisting right, is founded either on a right which avails against all persons, such as the right of him who is the owner of a thing; or it is founded on a contract expressed or implied, which is a right against some determinate person or persons. The right of action which is founded on an injury, is simply a right which a man acquires in consequence of the act or omission of another man.

The Roman division of actions bears some analogy to the English division, but it is more clearly conceived.

In the English system, actions are divided into real, personal, and mixed.

Real actions are so called because they exclusively refer to real property, or things connected with land. They are brought for the recovery of lands or tenements, rents, advowsons, or other hereditaments. The word *real* here signifies that the action is in respect of a thing (res). In the Roman system the expression, *in rem*, did not mean that the action was in respect of a thing (res), but it was a technical mode of expressing the *generality* of the action, as opposed to *in personam*, which had reference to a particular person or persons.

Personal actions are those in which a man either claims the recovery of a debt, or some personal chattel, or satisfaction in damages for some injury to his person or property. The personal actions of the English law do not exactly correspond with Roman actiones in personam, as will appear from what has been said.

Mixed actions partake of the nature of real and personal actions, being brought for the recovery of lands, and also for damages,—either for some injury done to the land, or some other wrong, such as the illegal detention of land from the proper owner.

All real and mixed actions were abolished by 3 & 4 Wm. IV. c. 27, except Writ of Right of Dower, Dower, Quare impedit, and Ejectment. The Action of Ejectment is the action in which land is recovered, and it is now commonly called a Mixed Action; but this appears to be incorrect, for it is in the form of an Action of Trespass.

Personal actions are founded either on contracts or on torts (a term used to signify such wrongs as are distinguishable from breaches of contract), and these torts are usually considered as of three kinds—nonfeazance, or the omission of some act which a man is bound to do; misfeazance, or the improper performance of some act which he may lawfully do; malfeazance, or the commission of some act which is unlawful. Actions founded on contract are sometimes described as actions ex contractu, and those on tort as actions ex delicto, a division which, as well as the terms used to express it, is derived from the Roman law (obligationes ex contractu, obligationes ex delicto: Gaius, iii. 182.)

Actions are either local or transitory: local actions are founded on such causes of action as refer to some particular locality, as in the case of trespasses to land; transitory actions, on such causes of action as may be supposed to take place any where, as in the case of trespasses to goods, batteries, and the like. Real actions are in their nature local; personal actions are for the most part transitory. Local actions must be tried in the county where the cause of action arose, and by a jury of that county: transitory actions may be tried in any county, at the pleasure (in general) of the plaintiff. When an injury is committed out of England, and its nature is such as to make the action local, no action will lie for its redress in any English court. If the nature of the injury is such that the action is transitory, such action will lie in the English courts, whether the injury was committed in England or elsewhere. When the cause of action arose abroad, in a transitory action it was formerly necessary to have recourse to a legal fiction, and to allege that it arose in an English county. This fiction is now abolished, though the plaintiff in his declaration is still required to specify in the margin some English county as that in which he intends that the cause should be tried. A plaintiff is not entitled to recover in respect of any damage that is too remote, or, in other words, flows not directly from an alleged wrong. In a case where the plaintiff, being a director of certain musical performances, brought an action on the case against the defendant for publishing a libel on a public singer engaged by the plaintiff, alleging that she was thereby deterred from performing in public through the apprehension of being ill received, so that the plaintiff lost the profits which would otherwise have accrued to him as such director, it was held that the damage was too remote, and the action not maintainable.

As to suits of every class it is generally true that the right of action is not assignable, so as to enable the assignee to sue at law in his own name; but in certain cases it is transferred by succession. Thus the rights of action of a bankrupt or insolvent pass, with certain exceptions, to their assignees, who are then universal successors, and

upon the death of either of the parties between whom a cause of action has arisen, the right of maintaining such action survives in general to or against his executors or administrators. But in respect to suits which are more strictly personal, that is, affect only the person, as in the case of an action for slander, the maxim is that they die with the person, and by the common law this extended to every case of tort; but it is now no longer the rule as regards torts committed in respect of property.

The 4 Edw. III. c. 7, empowers executors or administrators to maintain an action of trespass for trespasses to the goods of the testator or intestate; and by 3 & 4 Wm. IV., c. 42, executors or administrators may maintain an action of trespass or trespasses on the case for any injury to the real estate of the deceased, which was committed six calendar months before his death, provided the action is brought within one year after his death. The same action may also be maintained against executors or administrators for any injury done by the deceased to the real or personal property of another, if it was done within six calendar months before his death, and the action is brought within six calendar months after the executors and administrators have assumed their office.

The 9 & 10 Vict., c. 93 (1846), allows an action for damages to be brought by the executor or administrator of a person deceased, when death has been caused by the wrongful act, neglect, or default of another, if the act, neglect, or default would have intitled the party injured to maintain an action and recover damages if death had not ensued. The action is for the benefit of the husband, wife, parent, or child of the deceased.

The regular parts of an action at law are:—1, the process, or those proceedings by which the defendant is compelled to appear, that is, to admit that he has a general intimation of the suit, and is ready to receive more particular notice of its ground and object; 2, the pleadings; 3, the trial and evidence; 4, the judgment; 5, the writ of error (where the judgment is supposed to be erroneous); 6, the execution.

By the stat. 2 Will. IV. c. 39, and the rules of court founded upon it, and by statutes 3 & 4 Will. IV. c. 67, and 1 & 2 Vict. c. 110, it is now provided that all personal actions shall be commenced by writ of summons, which is a writ issued out of the court in which the action is brought, directed to the defendant, and which, without setting forth the particular cause of action, but merely describing the action as one of debt, trespass, or the like, commands him to cause an appearance to be entered therein within eight days after the writ shall have been served upon him. Previously to the passing of the last-mentioned statute a plaintiff might commence an action of debt by arresting the defendant where the alleged subject of dispute was a debt to the amount of 20*l.* at the least. Arrest on mesne process is now abolished.

(Stephen, *New Commentaries*, iv. 456; Stephen, *On Pleading*; Chitty, *On Pleading*.)

ACTION UPON THE CASE. [Case, Action upon.]

ACTION AND RE-ACTION. [Motion, Laws of.]

ACTION, LEAST, PRINCIPLE OF, is a name given by Lagrange to a law of motion which he has thus enunciated:—In a system of moving bodies, the sum of the products of the masses of the bodies by the integral of the products of the velocities and the elements of the spaces passed over, is constantly a maximum or a minimum.

The principle, in a limited sense, originated with Maupertuis, and it was afterwards employed by Euler; but its generality was established by Lagrange, who has extended it to the motion of a system of bodies acting upon one another in any manner whatever; and his first applications of it to the solution of dynamical propositions are contained in the second volume of the 'Mémoires de l'Académie, &c., de Turin.'

The analytical expression of the principle is, that $\Sigma m \int v ds$, or $\int \Sigma m v ds$, is a maximum or a minimum, or that the infinitely small variation of that quantity is zero. (Here m is the mass of a body, v its velocity, and ds the element of the space passed over.) But $ds = v dt$ (dt being the element of time); therefore, $\int \Sigma m v ds$ is equivalent to $\int \Sigma m v^2 dt$. Now, $\Sigma m v^2$ is the expression for the active or living force of a finite number of bodies or molecules [Vis Viva]; and it follows that the principle of 'least action' is the equivalent of the expression that the integral of the product of the living force of a system by the element of time, is in general a minimum.

A'CTIUM, a point of land at the entrance of the Ambraciot bay, now the Gulf of Arta, which is memorable for the sea-fight which took place near it, in the Bay of Prevesa, between C. Julius Cæsar Octavianus, afterwards the Emperor Augustus, and Marcus Antonius, B.C. 31. Antonius was completely defeated, and fled with his mistress Cleopatra, who was present at the engagement, into Egypt.

ACTIVE OR LIVING FORCES. [Vis Viva.]

ACTIVE MOLECULES, in plants, are extremely minute, apparently spherical, moving particles, found in all vegetable matter when rubbed in pieces and examined under very powerful microscopes. In size they vary from the $\frac{1}{13000}$ to $\frac{1}{30000}$ of an inch in diameter, and are only to be detected with lenses capable of magnifying at least 300 diameters. Viewed under favourable circumstances, immersed in water, and with transmitted light, they are seen to have a rapid motion of an oscillating nature, so that a minute drop of the fluid in which they swim seems to be as it were alive. In the pollen of plants they are extremely numerous, and perfectly distinct from each other, so that a grain of pollen crushed in water is one of the best subjects for the observer to select; he will there find the active molecules mixed with oblong or cylindrical particles of a larger size, and equally in motion; the latter are the spermatic granules, by the agency of which the fertilization of plants probably takes place.

To find the active molecules in other parts of plants it is necessary that they should be crushed and rubbed in water till it becomes greenish; a drop of the coloured fluid will be found to contain vast numbers of these molecules moving about with great rapidity and exhibiting every appearance of animal life. Curious as these circumstances undoubtedly are, it is still more singular that the movements of the molecules do not cease with the life of a plant; on the contrary, they have been witnessed by Dr. Brown even in the fossilized remains of vegetables, and may be readily seen by colouring water with the dead vegetable matter called Gamboge, when the molecules are instantly set at liberty, and commence their motions.

ACTON, JOSEPH, prime minister of the court of Naples, was born in 1737: his father was an Irish gentleman residing in France. He was originally in the French naval service; but subsequently obtained the command of a frigate from Leopold, duke of Tuscany. In an unsuccessful expedition against Algiers, in 1774, in which the government of Tuscany co-operated with that of Spain, Acton commanded the Tuscan vessels; and by his gallant conduct succeeded in saving three or four thousand Spanish soldiers, who must otherwise have perished. He was in consequence recommended to the service of the king of Naples, and was successively minister of the navy, of war, of finance, and ultimately became prime minister. In his policy he was constantly opposed to the French party in Italy. He is said to have died in obscurity, in Sicily, in 1808.

ACTON BURNEL, STATUTE OF. This statute was passed at Acton Burnel, in Shropshire, at a parliament held by Edward I. in the eleventh year of his reign, on his return from Wales. Acton Burnel was never even a market-town, and Leland says ('Itin.' vii. 19), that the parliament was held in a great barn. The date of the statute is October 12, 1283. It is a proof of the importance which the mercantile class had acquired: its object was to recover more quickly debts due to merchants and traders. Hence it is sometimes called the Statute of Merchants (Statutum Mercatorum).

The preamble recites, that, 'Forasmuch as merchants which heretofore have lent their goods to divers persons be greatly impoverished because there is no speedy law provided for them to have recovery of their debts at the day of payment assigned; and by reason thereof many merchants have withdrawn to come into this realm with their merchandises, to the damage as well of the merchants as of the whole realm;' and therefore 'the king by himself and his council ordain and establish' certain remedies for the evils complained of. ('Stat. of the Realm,' i. 53.) This statute enacted that a debtor's chattels and devisable burgages might be sold to pay his debts.

In a parliament held in the thirteenth year of his reign (1285) the king caused the statute of Acton Burnel to be rehearsed; and another Statutum Mercatorum (13 Edw. I. stat. 3) was passed which extended and gave additional facilities for enforcing the statute of Acton Burnel. Under this new statute all the debtor's lands might be delivered to the merchant creditor, to hold till the debt was levied; and the merchant had such a seisin of the lands delivered to him that he could maintain a writ of Novel Disseisin. The security which the merchant obtained under this act is called a Statute Merchant. (Cruise's *Digest*, ii., tit. 14.)

ACTS OF THE APOSTLES. [APOSTLES.]

ACTS of SEDE/RUNT (in the law of Scotland) are statutes made by the Lords of Session, by virtue of a Scottish Act of Parliament, passed in 1540, which empowers them to make such constitutions as they may think expedient for ordering the procedure and forms of administering justice. These are called Acts of *Sederunt*, because they are made by the Lords of Session *sitting* in judgment.

ACTUARY, a word which, properly speaking, might mean any registrar of a public body, but which is generally used to signify the manager of a joint-stock company under a board of directors, particularly of an insurance company, whence it has come to stand generally for a person skilled in the doctrine of life annuities and insurances, who is in the habit of giving opinions upon cases of annuities, reversions, &c. Most of those called actuaries combine both the public and private part of the character.

An actuary combines with the duties of a secretary those of a scientific adviser to the board which gives him his office, in all matters involving calculation, on which it may be supposed that the members of the board are not generally competent to form opinions themselves.

The name has a legal character, from its being recognised in the statute 59 Geo. III. c. 128 (or the Friendly Societies' Act of 1819), which enacts, that no justice of the peace shall allow any tables, &c. to be adopted in any Friendly Society, unless the same shall have been approved of by 'two persons at the least, known to be professional actuaries, *or persons skilled in calculation*'—a definition much too vague to be any sufficient guide. The Committee on Friendly Societies of 1825 reported that 'petty schoolmasters or accountants, whose opinion upon the probability of sickness and the duration of life is not to be depended upon,' had been consulted under this title; and recommended that the actuary of the National Debt Office should be the only recognised authority for the purposes above mentioned; in which recommendation the Committee of 1827 joined. In the 10 Geo. IV. c. 56, however, no alteration was made in the law on this point; but by the 9 and 10 Vict. cap. 27, the power is confined to the actuary of the National Debt Office, or an actuary of not less than five years' standing in some public insurance company.

The registrar of the Lower House of Convocation is called the actuary. Bishop Gibson says that he is an officer of the archbishop, the president of the convocation, and cites as follows, from the fees established by Archbishop Whitgift (1583-1603) for the vicar-general's office:—'Feoda Actuario Domus Inferioris Convocationis solvenda.' (Gibson's *Synodus Anglicana*, 1702.)

The word Actuary is from the Roman 'actuarius,' which was used in various senses, but its

earlier and more common meaning was 'short-hand writer.'

(Suetonius, *Julius Cæsar*, 55; Facciolati, *Lex.*, art. *Actuarius.*)

ACU'LEUS, or PRICKLE, in botany, is a hard, conical, often curved, expansion of the bark of some plants, such as the rose, and is intended either for their defence against enemies, or to enable them to hook themselves upon their neighbours, so as to gain a more free access to light and air, or for other purposes unknown to us. The prickle is composed entirely of cellular tissue, which is at first soft and flexible, and only acquires its hardness and rigidity by degrees as the plant arrives at its perfect growth.

ACUPUNCTURE, a Latin compound, which denotes the insertion of a needle into the skin or flesh. Acupuncture is an operation which has been long in use in the East, and which appears to have been adopted there from the notion that several diseases attended with severe pain arise from air or vapour pent up in the body, to which a puncture with a needle affords an outlet, and thereby removes the malady. Europeans who travelled in those countries several times witnessed the practice, and were struck with the results; but either their reports were not credited, or the operation appeared to the physicians and surgeons of Europe so unpromising, that upwards of a century elapsed after the knowledge of it was familiar to many European practitioners before a single trial of it was made.

There are two cases in which it is found to be beneficial,—first, in painful local affections, unattended with change of structure in the part diseased, and without local inflammation or general fever,—and, secondly, in that species of dropsy, termed anasarca, in which the water is accumulated in the cells of the cellular membrane that lies immediately beneath the skin.

AD LIBITUM (or *ad lib.*, *at discretion*, *at pleasure*), in Music, denotes that the performer is at liberty to pause, or to introduce any cadence or addition of his own, according to his judgment. An accompaniment is said to be *ad libitum* when it is not essential, and may be either used or omitted, as circumstances may require, without materially affecting the composition.

ADA'GIO, in Music, an Italian adverb signifying *slowly*, *leisurely*, and used to indicate the slowest movement in music. It is the custom to point out the quickness and character of a piece of music by some Italian word, placed at the beginning of the composition. These are sometimes very inadequate, and much is commonly left to the judgment of the performer. The use of the metronome [METRONOME], fixes the intention of the composer as regards quickness or slowness; but with respect to style or expression much must still depend on the taste of the performer.

The five principal terms, denoting the degrees of motion, are—*Adagio*, very slow; *Largo*, slow; *Andante*, a moderate time; *Allegro*, quick; and *Presto*, very quick.

All the others are subordinate modifications.

ADAL, a country between Abyssinia and the Red Sea, scarcely known in Europe till 1839, but since then examined and described by Isenberg, Krapf, and Beke. It lies near the south-western extremity of the Red Sea, and comprises the low land along the shore, about 300 miles in length. The coast-line, 10 or 12 feet high, and the adjacent islands, are mostly of coral formation. At one part of the coast is an isolated mountain, Mount Gedem, about 5000 feet high; and there are numerous conical hills from 200 to 300 feet in height. The low tracts along both sides of the Red Sea, are among the hottest countries on the globe; the temperature being frequently 90° before sunrise, and the ground produces scarcely anything fit for use.

The interior of Adal is only known along the routes which European travellers have followed in ascending from the sea to the table-lands of Tigré and Shoa. These routes are from Massowah to Tigré, and from Tajurrah to Ankóbar. In the former of these there is a gradual ascent of 8000 feet, from the lowlands of Adal to the highlands of Abyssinia, furrowed by ravines through which rivers flow. The soil is in some parts sandy, in others grassy and fit for pasture, in others covered with trees and bushes, according to the varied slope of the ascent. Camels, mules, asses, goats, and sheep are abundant. This tract is the haunt of numerous wild animals; elephants are sometimes met with, which have descended from the table-land. Lions, also, sometimes make their appearance; and there are numerous wolves, hyænas, lynxes, leopards, foxes, wild hogs, antelopes, and hares.

The route just described is the usual one for reaching Abyssinia; but the southern one, from Tajurrah to Ankóbar, is now recommended. The ascent to the interior table-land is less steep than the former, and comprises an intermediate terrace, or lower table-land, diversified with hills, glens, grassy spots, lagoons, beds of lava, and a few fertile tracts. One remarkable feature is Bahr Assal, a salt lake sunk in a depression 570 feet below the level of the sea, and partly covered with a sheet of salt 6 inches thick. From this salt lake the country rises very precipitately. The inhabitants procure water by digging wells in the beds of dry rivers. At one part are two lofty peaks, Mount Abida and Mount Aiyalu or Azolo. Mount Abida rises about 4000 feet above its base, and Azolo still higher. They appear to stand in the centre of a volcanic tract, from which sheets of lava have descended on all sides to the plain, forming a field of volcanic matter about 30 miles in diameter, studded with small cones, each showing a distinct crater. Mr. Kirk counted twenty-one of such cones. At one part of the route the river Hawash is crossed, which is supposed to be navigable 300 miles above its mouth.

With the exception of the country contiguous to the two caravan roads which have been noticed, the interior of Adal is almost unknown. Vessels passing through the Strait of Bab-el-Mandeb observe high peaks in the heart of the country; and Mr. Coffin traversed it in one direction, but the information obtained is very scanty. At one spot there is a plain having a bed of salt

about three feet thick. In some places it continues tolerably pure to that depth, but in general not lower than two feet. As this salt is not only used for culinary purposes, but also, in Abyssinia, as a currency, it is cut into pieces of the shape of a scythe-whetstone; they are about nine inches long, 1¼ inch thick, in the middle two inches wide; they weigh between 19 and 20 ounces. The value differs greatly, according to the distance from the place where it is obtained.

Adal is inhabited by many tribes, which are comprehended under the name of Danákil or Dankali, and they all appear to belong to the same stock. The missionaries Isenberg and Krapf found tribes of the same race in different parts of the district; and Rüppel describes one tribe, the Shohos, as having a strongly set and bulky body; the face is round rather than oblong; the hair is black, thick, and very crisp, almost woolly; the eyes are very lively, but small and set deep in their sockets; the nose is short and straight, and divided from the forehead by a depression; the lips are thick, but not so thick as those of the negroes; the colour is dark brown. Their language appears to differ entirely from that which is spoken in Tigré and Shoa. The Danakil lead a nomadic life. They keep a large number of camels, cattle, mules, asses, and sheep, and a few horses of a small breed; and change their places of abode according to the seasons, to which they are principally compelled by the want of water, at the close of the dry season. They are Mohammedans.

Adal does not supply any article for foreign commerce, except the salt of Bahr Assal. But the inhabitants of the country between the sea and the nations which cultivate the soil have attained a higher degree of civilization, and consume some articles of Indian growth and manufacture; and these articles are carried through their territories by caravans. When the English took Aden, on the opposite shore of the Red Sea, in 1839, it opened a prospect of much renewed traffic through Adal.

ADAM, the first man, and progenitor of the human race, whom God formed of the dust of the ground, on the sixth and last day of the creation, as related in the first and second chapters of Genesis. The whole of the authentic history of Adam is contained in the first five chapters of that book.

ADAM, ALEXANDER, LL.D., was born in June, 1741, at Coats of Burgie, in the parish of Rafford, Morayshire, of poor parents. He learned Latin at the parish school, and after an unsuccessful attempt to procure a bursary at King's College, Aberdeen, he went to the University of Edinburgh in the winter of 1718. He had to endure great privations owing to his scanty means, but he persevered in his studies till he got the reputation of being one of the best scholars in the university. In 1761 he was appointed one of the teachers in Watson's Hospital, at Edinburgh, which situation he held till 1767, when he was chosen Assistant to the Rector of the High School. On the death of the Rector in 1771, Adam was appointed his successor, and in this honourable situation he remained during the rest of his life.

In 1772 he published a little work, entitled 'The Principles of Latin and English Grammar,' and he introduced it into the school as a substitute for Ruddiman's Grammar, which had been for many years the established manual. The four under-masters resisted this innovation, and at last the dispute grew to such a height, that the town-council, who are the managers of the school, had to interfere. (Chalmers's 'Life of Ruddiman,' pp. 91-96, and 390-403.) After a long dispute, the town-council finally decided against the rector's grammar. Dr. Adam also published the following works:—In 1791 a volume entitled 'Roman Antiquities,' which has gone through several editions, and been translated into German, French, and Italian: it is a work highly creditable to the author, though in many respects it is now behind the present state of philological knowledge, nor have subsequent editions either supplied all that is wanting or corrected all that is erroneous; in 1794, a 'Summary of Geography and History,' also several times reprinted; in 1800, a 'Dictionary of Classical Biography;' and in 1805, a Latin Dictionary, under the title of 'Lexicon Linguæ Latinæ Compendiarium,' being an abridgment of a larger work, on which he had been long engaged. A second edition of this last has been published since the author's death, with very considerable alterations, both in the way of addition and of curtailment. No person filling a public situation was more universally respected and esteemed in Scotland than Dr. Adam in his latter days. His character was one of great manliness; so much so as to make him sometimes perhaps indiscreetly bold in the expression of whatever he felt. His political opinions were of a strongly liberal complexion; and he has been accused of not scrupling sometimes to give them vent with considerable emphasis in the presence of his class. But such was the general regard which was felt for him, that this charge which, especially at the time when it was made, would have seriously injured almost any other schoolmaster, scarcely affected his influence or usefulness. He was carried off by apoplexy on the 18th of December, 1809, in his sixty-ninth year, and was honoured by his fellow-citizens with a public funeral. A memoir of his life was published in 8vo., in 1810.

ADAM, JAMES, an architect of the last century, who is only known as the partner of his brother Robert. He died in 1794.

ADAM, ROBERT, born at Kirkaldy, in Fifeshire, according to some authorities, and, according to others, at Edinburgh, in the year 1728. Robert received his literary education at the University of Edinburgh; and from his father, it seems most likely, he derived instruction in the principles and practice of his future profession.

When he was in his twenty-sixth year, Mr. R. Adam went to Italy, where he remained several years. His contemporaries, James Stuart and Nicholas Revett, were then engaged in exploring the architectural remains of Athens; but so little was Grecian architecture known and appreciated, that Adam, instead of visiting Athens, went to Spalatro in Dalmatia, to measure and delineate the ruins of the palace of Diocletian, a structure

indicating alike the decline of civilization and the progress of barbarism. In this tour he was accompanied by Clérisseau, a French architect, whose name is connected with a work on the remains of a Roman temple at Nismes. Mr. Adam returned from the Continent about the year 1762, and settled in London, and shortly afterwards published there, in a large folio volume, engraved representations and descriptions, with attempted restorations, of the Dalmatian palace.

About the same time, 1763-4, Mr. R. Adam was appointed architect to the king. In the course of a few years he designed, and, in conjunction with his brother James, executed a great many public and private buildings in England and in Scotland. In 1773 the brothers commenced the publication of their works, in large folio engravings, with letter-press descriptions and critical and explanatory notes, in numbers, which were continued at intervals down to 1778. The principal designs included in these are, the screen fronting the high road, and the extensive internal alterations of Sion House, near Brentford, Middlesex; Lord Mansfield's mansion at Caen Wood, Middlesex; Luton House, Bedfordshire, for Lord Bute; the screen to the Admiralty Office, London; the Register Office, Edinburgh; Shelburne House, now Lansdowne House, Berkeley Square, London; the parish church of Mistley, in Essex; and some others. The Messrs. Adam also designed the infirmary at Glasgow, and some extensive new buildings in the University of Edinburgh, though their practice, after the year 1780, was principally in London. Portland Place, Stratford Place, and Hamilton Place, the south and east sides of Fitzroy Square, and the buildings of the Adelphi, are the most extensive of these works. The Messrs. Adam were among the first to make use in London of a stucco in imitation of stone, for external architectural decorations.

The Messrs. Adam certainly did much to improve the street architecture of London, though their designs are by no means always characterized by good taste.

With the Adams, we believe, originated the idea of giving to a number of unimportant private edifices the appearance of one imposing structure, by external architectural arrangements; and they certainly have the credit of having carried this principle extensively into effect in several of the instances we have mentioned.

Mr. R. Adam continued to be actively engaged in business down to the period of his death, which took place in March, 1792. He was buried in Westminster Abbey, in the south transept of which is a tablet to his memory.

ADAM (Sculptors). There were three brothers of this name, natives of Nancy, in France. The eldest, Lambert-Sigisbert Adam, was born in 1700, and went to Paris in 1719. After remaining there four years, he gained the first prize in the Academy, and went to Rome on a pension allowed him by the king. He spent about ten years at Rome, and among other works furnished the design which was adopted by Clement XII., for the Fountain of Trevi. The offers of the French government induced him to return to Paris. On the 25th May, 1737, he was admitted a member of the Academy, and he was afterwards appointed professor in that institution. Adam published, in 1754, a work entitled 'Recueil de Sculptures Antiques Grecques et Romaines.' He died in 1759. Nicolas-Sébastin, the next brother, was born in 1705. He went to Paris at the age of eighteen, and to Rome in 1726, where, two years afterwards, he obtained one of the prizes at the Academy of San Luca. Having remained there nine years, he returned to Paris. He died in 1778. The third brother, Gaspard-Balthasar, was born in 1710. He made his way, like his elder brothers, to Rome, and also on his return from Italy fixed his residence at Paris. He worked for some years at Berlin, in the service of the king of Prussia, and died at Paris in 1761.—(*Biographie Universelle.*)

ADAM'S APPLE. [CITRUS; MUSA.]

ADAM'S BRIDGE, a name given to a series of sand banks and two small islands, situated beween India and the island of Ceylon. The width of the channel is about sixty-nine miles, and there are only two navigable passages in it. One, called the Manaar passage, which separates the island of Manaar from the coast of Ceylon, has not more than four feet water at flood-tide. The other, called the Paumbeen passage, separates the main land from the island of Ramisseram. The Paumbeen passage is very narrow, and not more than six feet deep at high water. The space between Manaar and Ramisseram, which is about thirty miles wide, is a bank of sand covered only at high water.

ADAM'S NEEDLE. [YUCCA.]

ADAM'S PEAK, called Hamalell by the natives, is the highest point of the island of Ceylon, and probably the centre of the mountain ranges in which the largest river of that island, the Mavela Gunga, takes its rise. Robert Knox, who was nearly twenty years a prisoner in the island, says, 'it is sharp like a sugar-loaf, and on the top there is a flat stone with the print of a foot like a man's on it, but far bigger, being about two feet long. The people of this land count it meritorious to go and worship this impression; and generally about their new year, which is in March, they, men, women, and children, go up this vast and high mountain to worship.' The print of the foot is fabled to have been left by Buddha, when ascending to heaven.

Adam's Peak is about 6° 50′ N. lat., 80° 35′ E. long., and 45 miles, E.S.E. of Columbo, which is on the west coast. The height of the mountain is about 7000 feet. The principal materials of which it is composed are gneiss and granite. Thick forests clothe the lower part of the mountain, which is, as Knox describes it, very steep and difficult of access. The path which leads to the summit is the work of the devotees who go to pay their respects to the sacred footstep.

A'DAMANT, a word no longer employed as a scientific term, but used chiefly as a poetical expression synonymous with diamond, or as descriptive of some other extremely hard substance. The word is derived from the Greek. Ἀδάμας (*Adamas*), in the genitive is Ἀδάμαντος (*Ada-*

mantos), the meaning of which was the same as that now in use.

ADAMANTINE SPAR is one of the many varieties of Corundum, from which it differs much in quality, but little in composition. [CORUNDUM.]

ADAMS, JOHN, a distinguished American statesman, was born in the town of Braintree, near Boston, in Massachusetts, on the 19th October, 1735, of a family which had come from England at the first settlement of the colony. Having received his education at Harvard College, he was called to the bar, and soon obtained extensive practice. In 1765, when the first serious discontent of the people of America was excited by the Stamp Act, Mr. Adams took an active part in those measures of constitutional opposition which eventually forced the repeal of that obnoxious statute. He continued, during the remaining first years of the struggle, to exert himself conspicuously in the front rank of the friends and supporters of the colonial cause. In 1774 he was elected one of the four representatives from the province of Massachusetts Bay to the general Congress, and which, among other proceedings, entered into a resolution to suspend the importation of British goods; and he was also a member of the second assembly of the same nature, held some time after, which took measures to enrol the people in an armed national militia. It had already become evident to many that the contest with Great Britain must finally be decided by the sword; and Adams seems to have been one of the first who adopted this conviction. He was accordingly one of the chief promoters of the Declaration of Independence, passed on the 4th of July, 1776. In 1780 he was sent by the United States as their ambassador to Holland; from which country, about the end of 1782, he proceeded to France to co-operate with Dr. Franklin and his brother commissioners in the negotiations for peace with the mother country. In 1785 he was appointed the first ambassador from the United States to Great Britain; and he had his first audience with his Majesty in that character on the 2nd of June. He remained in England till October, 1787. In 1789, when Washington was elected President of the Union, Mr. Adams was elected Vice-President, and he was re-elected to the same office in 1793. In 1797, on the retirement of Washington, he was chosen President; but he failed to be re-elected on the expiration of his first term of four years, his competitor, Mr. Jefferson, who had also been opposed to him on the former occasion, having a majority of one vote. The general tone of the policy of Adams had been opposed to that of the democratic party, which was represented by Jefferson. The rest of his life he spent in retirement. For some years before his death his health had become extremely feeble, and at last little more remained of the once active and eloquent statesman than the mere breath of life. In this state he was when the morning arrived of the 4th of July, 1826, the fiftieth anniversary of the Declaration of Independence. Awakened from sleep by the ringing of bells and other rejoicings of that grand jubilee, the venerable patriot was asked if he knew the meaning of what he heard. 'Oh yes,' he replied, the glow of old times seeming to return to him for a moment, 'It is the glorious 4th of July!—God bless it—God bless you all!' Some time after he said—'It is a great and glorious day,'—adding, after a pause apparently of deep thought,—'Jefferson yet survives.' These were the last words he was heard to utter. At six in the evening he expired. The same day also terminated the career of Jefferson, his fellow-labourer in laying the foundations of the independence of their common country, and afterwards his successful rival. Except for a short time, however, these two distinguished men were friends throughout life.

ADAMS, SAMUEL, a conspicuous actor in the American Revolution, was born at Boston in 1722. On the first outbreaking in his native province of the irritation and disturbances occasioned by the Stamp Act, in 1765, Adams threw himself with zeal and determination on the popular side. From that moment the forwarding and maintaining of the cause of his country's independence became the business of his life. After the conclusion of the war he was a member of the senate of Massachusetts, and was subsequently governor of that state. He died at Boston on the 2nd of October, 1803.

ADANSON, MICHAEL, a French naturalist of high reputation, was born at Aix, in Provence, April 7, 1727. He was of Scotch extraction, but his family had become exiles in consequence of the troubles that distracted Scotland in the early part of the 18th century. At a very early age he was placed at the University of Paris, under the care of the celebrated Réaumur and of Bernard de Jussieu; and it is supposed that from these preceptors he imbibed that love of the study of Natural History by which he afterwards became distinguished in so eminent a degree. His success in carrying off the academical prizes from his competitors soon attracted attention; and Needham, the well-known microscopic observer, having upon one occasion been witness to his triumph, presented him with a microscope, accompanied, it is said, by these prophetic words, 'Young man, you have studied books enough; your future path will be among the works of nature, not of man.' He was destined for the church, but a feeling that his pursuits, and perhaps his temper, were but ill-adapted to the duties of the priesthood, induced him to resolve upon seeking some other employment, in case his slender patrimony should prove insufficient for his wants.

The genius of Adanson was much too active to allow him to remain in the walks of quiet life. An opportunity occurred of visiting Africa, and in 1748 he embarked for Senegal, being then twenty-one. Five years were spent by him in this colony during which time he succeeded in forming considerable collections in every branch of natural history. He returned to Paris in 1753, rich in knowledge, but impoverished in worldly means. His 'Natural History of Senegal,' published at Paris four years afterwards, is a mass of original views, and of valuable practical information. Among other things, it contains the first attempt upon record of classifying shells according to the

animals they contain, instead of their external forms alone. The opinions that Adanson had early held of the insufficiency of the classifications in natural history at that time received in Europe, had become confirmed by his discoveries in Africa. He saw that however easy and complete the systems of Linnæus and Tournefort might seem to those acquainted with the European Flora only, they were both essentially defective when applied to vegetation in a more extended manner. He perceived that the sexual system of Linnæus was founded upon incomplete and partial views. To the method of Tournefort the objections appeared fewer, and accordingly he determined to attempt a classification of his own, of which that of Tournefort might serve as the basis. This appeared in 1763, in two volumes 8vo, under the name of 'Families of Plants.' Unfortunately for its author, and still more for science, his views were more advanced than those of his contemporaries; his perceptions of botanical truths, however just, were of a nature not to be valued by those who had less experience or acuteness than himself; he also attempted to introduce a barbarous nomenclature, which, it must be confessed, was at variance with common sense; and, what was worse than all, he had unceremoniously rejected that system of Linnæus, which had become the basis of the botanical creed of almost all Europe. For these reasons, notwithstanding the high character of Adanson's 'Families of Plants,' they have scarcely had any circulation beyond France; and when, in 1789, the 'Genera Plantarum' of Jussieu made their appearance the utility of his work generally ceased.

From this period we have little to record concerning the scientific career of Adanson. A few miscellaneous papers, a chimerical project of a vast Encyclopædia of Natural History, to contain 40,000 figures, and a portion of the early part of the botanical division of the Supplement to the French Encyclopædia, are all that he has executed. Up to the period of the French Revolution, he appears to have been chiefly occupied in amassing collections for the stupendous work he had in contemplation, and in making experiments upon vegetable physiology. That political catastrophe overwhelmed him in the ruin it brought for a time upon his country; the little that remained of his fortune was annihilated; he had the mortification to see his plantations of mulberry-trees, which had been long the object of his simple care, destroyed by a ferocious rabble; and he fell into so lamentable a state of destitution, that when upon the establishment of the Institute of France some years after, he was invited to become one of the earliest members, he was obliged to refuse the invitation to attend 'because he had no shoes.' In his latter days he enjoyed a small pension from the French government; but his constitution was broken by the calamities he had undergone; a complication of maladies tormented him, a softening of the bones confined him to his bed, and on the 6th August, 1806, he was finally released from his afflictions by the hand of death, in the 79th year of his age.

(*Biographie Universelle.*)

ADANSO'NIA, so called in honour of Michael Adanson, the naturalist, is an extraordinary tree found in Africa within the tropics, particularly in Senegal, where it is called *Baobab*.

The celebrated traveller Humboldt considers it as the 'oldest organic monument of our planet,' in consequence of the calculations of Adanson that specimens, still found on the north-west coast of Africa, are probably 5000 years old; these calculations are, however, open to many objections. *Adansonia* is unlike any other known tree: the enormous dimensions of its trunk bear a striking disproportion to the other parts; it is not unusual to find a trunk not more than twelve or fifteen feet from the root to the branches, with a circumference of seventy-five or seventy-eight feet. The lower branches are very long, and at first horizontal, extending, perhaps, sixty feet; the consequence of which is that they bend down to the ground, entirely hiding the trunk, and giving the tree the appearance of a huge mass of verdure. The wood is very soft, even when in perfection, and is subject to a disease which may be compared to the very malady of which its celebrated discoverer died—a sort of softening of all the hard parts, so that the least storm is sufficient to overthrow and dismember its enormous bulk. A curious practice prevails among the negroes of hollowing its trunk out into chambers, and therein depositing the bodies of malefactors, or of persons to whom the usual rites of sepulture are denied. In this situation the bodies become dried up, and soon acquire the state of perfect mummies.

Adansonia belongs to the natural order *Bombaceæ*, among which it is at once known by a broad tube of stamens and deciduous calyx, combined with a woody-closed fruit, containing a soft pulp.

A'DAPIS. The name given by Cuvier to an extinct quadruped which he refers to the order PACHYDERMATA. The fossil fragments of the Adapis have been found in the plaster-of-Paris quarries of Montmartre, and consist, we believe, of portions only of a few skulls. The adapis was evidently a small animal, as these remains indicate, and could not have exceeded a hare in size, perhaps not a rabbit. There are four sharp-edged and oblique incisors in each jaw, followed on each side by a conical canine tooth, not exceeding the molars in length. Of the latter there are seven on each side in each jaw—in the upper, the first is trenchant, the second and third surrounded by a small ridge, and the last four flat-crowned. In the lower jaw the first three molars are pointed, the remainder flat-crowned and tuberculous. Of the general outline of the skull the fragments give but an indefinite idea.—(Cuvier, *Sur les Ossemens Fossiles.*)

ADAR, Hebrew month. [YEAR.]

ADDA, or *El Adda*, the Arabic name of a species of small lizard found abundantly in Arabia, Egypt and Nubia, and which burrows in the sand with incredible rapidity. It delights to bask in the rays of the sun; but, when alarmed, disappears with magic celerity. It feeds on insects. This lizard is the skink or scink (*Scincus officinalis*, Σκιγγος, of the Greeks), and was formerly

believed to be endowed with surprising medicinal virtues; it was consequently an object of commerce, especially in the sixteenth century. Numbers, as Pliny states, were imported to ancient Rome in a salted state, as Belon says they were in 1551. All belief in the virtues of this lizard is now exploded; it no longer retains a place in the materia medica; and even in Egypt and Arabia its reputation is gone.

ADDA, the Roman Addua, a river of Lombardy, rises in the Rhætian Alps, near Bormio; passing through the Valteline it enters the lake of Como, from the south-eastern branch of which it issues below Lecco; it then crosses the plain of Lombardy and falls into the Po about eight miles above Cremona. Its general course is to the S.W., and its length about 182 miles. Before the fall of Venice the Adda formed the boundary between the territory of that republic and the duchy of Milan. It is a rapid and wide stream, affording a good military position, in advance of Milan on the east.

ADDAX, a large antelope inhabiting the deserts of Nubia and Kordofan. It was called by the ancients Strepsiceros from its spirally twisted horns. Its Arabic name is Addas or Abou-Addas. [ANTELOPE.]

ADDER. [VIPER.]

ADDER'S TONGUE. [OPHIOGLOSSUM.]

ADDISON, JOSEPH, was the son of the Reverend Lancelot Addison, who eventually obtained the deanery of Lichfield, but was, at the time of the birth of his son, rector of the parish of Milston, near Amesbury, in Wiltshire. Here Addison was born, on the 1st of May, 1672. After the early discipline of two provincial schools, he was sent to the Charter-house, and was there a fellow-pupil with Richard Steele. About the age of fifteen he was entered at Queen's College, Oxford; but he removed to Magdalen College upon obtaining a scholarship two years afterwards. His facility of reciting Latin verse first brought him into reputation at the university. The first composition which he gave to the world in his native language was a copy of verses addressed, in 1694, to Dryden, which procured him the acquaintance of that distinguished poet.

Addison had very early made some advantageous connections with official persons, particularly with Lord Somers, and Mr. Montague, afterwards Lord Halifax. He gave up his design of entering the church, and obtained a pension from the Crown, which he lost on the death of King William. The great victory of Blenheim was supposed to require a dignified poem for its celebration: Addison was engaged to write 'The Campaign,' and was rewarded with office, holding several appointments from 1704 to 1710, when a change of ministry released him from the official duties for which he was probably but little fitted. He was in Ireland when the first number of the 'Tatler' appeared on the 12th of April (o. s.) in 1709—the happy idea of Steele. The active part which he immediately took in the conduct of this periodical work is well known. The 'Tatler' terminated on the 2nd of January, 1711; but on the 1st of March following appeared its still more celebrated successor, the 'Spectator,' which was continued till the 6th of December, 1712, and of which, during the whole of that time, Addison was undoubtedly the chief support. The 'Spectator' was followed by the 'Guardian,' of which the first number was published on the 12th of March, and the 175th and last on the 1st of October, 1713; and in this also his pen was actively employed. The same year he acquired still greater fame than any of his former productions had brought him by his celebrated tragedy of 'Cato,' which was received with extraordinary applause, both on the stage and when it issued from the press. On the 18th of June, 1714, appeared the first number of a continuation of the 'Spectator,' in which Addison also assisted till its termination on the 20th of December in the same year. On the 23d of December, 1715, soon after the breaking out of the Rebellion, he commenced a periodical publication in support of the government, under the title of the 'Freeholder,' which he continued, without assistance, at the rate of two papers a week, till the 29th of June in the following year. He had now, indeed, for some time been again engaged in public affairs. In 1716 he married the Dowager Countess of Warwick; and in April the following year he was nominated one of his Majesty's principal secretaries of state. He soon, however, found it necessary to resign this high employment,—retiring professedly on the ground of ill-health, but in reality, as has been generally understood, in consequence of his entire inaptitude both for debate in Parliament and for the ordinary business of his office. His health had been for some time impaired by attacks of asthma,—the effects of which were probably in no slight degree aggravated by a habit of over-indulgence in wine, to which he had long been addicted, but to which after his marriage he gave himself up more than ever, seeking refuge in its baneful excitement from domestic unhappiness. He left office in March 1718. It was hoped, at first, that his release from business would have brought about his restoration, and for some time the expected effect seemed to follow. He again however fell ill, and, after lingering for some time, at last expired at Holland House, Kensington, on the 17th of June, 1719, when just commencing his forty-eighth year. He left a daughter by the Countess of Warwick.

The literary greatness of Addison in the estimation of his contemporaries probably stood upon somewhat different grounds from those upon which it is now usually placed. In his own day he was looked upon as a dramatist and a poet of a very high order. The taste which then prevailed in poetry was the most artificial which has distinguished any age of English literature. The return of the public mind to truer principles of judgment in such matters has been fatal both to the dramatic and to the poetical fame generally of Addison. His glory is now that of one of our greatest writers in prose. Here, with his delicate sense of propriety, his lively fancy, and above all,

his most original and exquisite humour, he was in his proper walk. He is the founder of a new school of popular writing, in which, like most other founders of schools, he is still unsurpassed by any who have attempted to imitate him. His 'Tatlers,' 'Spectators,' and 'Guardians,' gave us the first examples of a style possessing all the best qualities of a vehicle of general amusement and instruction; easy and familiar without coarseness, animated without extravagance, polished without unnatural labour, and from its flexibility adapted to all the varieties of the gay and the serious.

ADDITION, from the Latin *addo*, to *put to*, is the putting together of two or more magnitudes into one. In Arithmetic and Algebra it also signifies the most convenient method of doing this, so that the sum or collection of added quantities may be counted or reckoned in the same manner as the parts of which it was composed. The sign of this operation is +, which is generally pronounced *plus*, the Latin for *more*. Thus $a+b$ directs us to add the number denoted by b to that denoted by a, and represents the sum of a and b.

We need say nothing of common addition of integers in arithmetic.

The addition of fractions is, in principle, as follows. We cannot immediately express the sum of one-half of a foot and one-third of a foot otherwise than by writing $\frac{1}{2}+\frac{1}{3}$ of a foot. But if we recollect that *one-half* is *three-sixths*, and one-third is *two-sixths*, it is evident that the sum of one-half and one-third is *five-sixths*. The rule, therefore, is:—reduce the various fractions to others of equal value, and having the same denominator, add the numerators, retaining the denominator: or, multiply every numerator by every denominator, except its own; add the results, which gives the numerator of the sum: multiply all the denominators together for the denominator of the sum. Thus for—

$\frac{2}{3}+\frac{3}{5}+\frac{4}{7}$ which is $\frac{199}{105}$

$2\times7\times5=70$
$3\times3\times5=45$ } Add
$4\times3\times7=84$
199 numerator
$3\times7\times5=105$ denominator.

To add decimal fractions, arrange them so that the decimal points shall fall under one another; proceed as in common addition, and let the decimal point in the sum total be placed under the other decimal points:—

2·61	14·103
·04	1·04
·118	118
2·768	133·143

To add algebraical quantities, write them all one after another, without changing any sign, and connect the terms which before had no sign, with the rest, by the sign +. Thus $a+b$ and $a-2b$ added, give $a+b+a-2b$. This is the sum, which may be reduced to a simpler form, by observing that b subtracted twice and added once, is equivalent to b subtracted once, and that a is added to a. The expression then becomes $2a-b$.

When the quantities are fractional, the preceding rule follows the application of another similar to the rule in fractional arithmetic. Thus, for

$\frac{a}{a+b}+\frac{b}{a-b}$ the sum of which is $\frac{a^2+b^2}{a^2-b^2}$

$a\times(a-b)=a^2-ab$
$b\times(a+b)=ab+b^2$ } Add

$a^2-ab+ab+b^2$
or a^2+b^2 numerator
$(a+b)\times(a-b)=a^2-b^2$ denominator.

ADELAIDE. [South Australia.]

ADELO'CRINUS, a fossil genus of Crinoidea from North Devon. (Phillips.)

ADELSBERG, a town near Laibach, in Austria, celebrated for the great caverns in its environs. There are two principal caverns, the cavern of Adelsberg, which is about 7500 feet long, and the Magdalena cavern, which has been explored for a length of about 1200 feet. The cavern of Adelsberg is the more remarkable of the two; it consists of several spacious grottoes, which are from 60 to 80 feet high. Splendid stalactites hang down from the roofs and cover the walls, and present a beautiful appearance by torch light. The Pink or Pinka, a little river, throws itself into the cavern; and as it forms several cascades, the interior resounds with the uninterrupted noise of the waters. In the innermost corner of the cavern this river disappears through a fissure in the rock, but continues its subterranean course for nearly eight miles, till it appears again near Malingradu-Kleinhäusel, where it is called Unze. It disappears once more in the caverns of Laase, and comes again to the surface near Ober-Laibach, as a navigable river, called the Laibach. In those parts of this river, which are subterranean, and especially in the cavern of Adelsberg, the Proteus is found. [Proteus.]

ADELUNG, JOHANN CHRISTOPH, grammarian and universal linguist, was born at Spantekon, a village in Pomerania, in 1732. In 1761 he settled at Leipzig, where he continued to reside till 1787. He was an unwearied literary labourer, devoting himself for the most part to the translation of foreign works. The number of volumes which up to this period he prepared for the press, and many of which he enriched with extensive additions of his own, is surprisingly great. He subsequently directed his principal studies to philology and languages. In 1787 Adelung was called to Dresden, and appointed principal librarian to the electoral library there. He died on the 10th September, 1806. The works by which he is best known in this country are his 'Deutsche Sprachlehre für Schulen,' and his 'Umständliches Lehrgebäude der Deutschen Sprache.'

ADEN, a town and harbour on the southern shores of Arabia, in the province of Yemen, 12° 46′ N. lat., 45° 10′ E. long. Before the British took possession of it, Aden was an ill-supplied miserable place, consisting of a small number of mud huts covered with mats, and containing about 600 inhabitants. At present it is a flourishing place of trade, containing 22,000 inhabitants, surrounded with gardens and orchards, in

which all the necessaries of life may be had at a moderate price.

The town is built at the eastern base of a mountain-mass called Jebel Shamshan, which rises to 1776 feet above the sea-level. This mountain-mass forms a peninsula, which is united to the mainland of Arabia by a narrow, low, and sandy isthmus about three miles in length. The British took possession of Aden in 1840, when a steam-boat navigation was established between Bombay and Suez. It has two harbours, which are considered the best on the coast of Arabia. The smaller one near the town is divided into two small bays by a rocky and fortified island called Sirah, which is about 430 feet high, and commands the harbours and town. Of late years the small creek which used to separate the island from the mainland has been filled up, so that at low water it is now joined to the coast. The anchorage in the bays is very regular, and a vessel may choose her own position in from five to ten fathoms water. But it is only safe for three months, from June to August, when the wind blows from the westward, during which time there is always smooth water close to the island. At other seasons the anchorage is exposed to the prevailing winds and to the swell of the sea. The other harbour, which is called by seamen the Back Bay, and by the Arabs Bander Tuwayyi, lies west of the peninsula, and has on the eastern side of its entrance another mass of rocks called Jebel Hasan, which rises 1237 feet above the sea. The entrance between these two masses is nearly four miles wide. The bay stretches northward about the same distance, but at its eastern extremity is a smaller bay, which extends eastward to the isthmus which unites the Jebel Shamshan to the mainland. A ship may anchor in any part of this bay; the soundings gradually decrease from five fathoms towards the shore with a clear sandy bottom. The Jebel Shamshan protects the anchorage against the prevailing winds and the swell. The tides are strong and irregular, owing to the influence of the outside currents. At full and change they rise eight feet and a half.

Aden appears in remote times to have been a place of importance. It occurs in the 'Periplus' under the name of Eudaimon, or the Prosperous. Alfonso Albuquerque made an abortive attempt to take it for Portugal in 1513. The Turks having got possession of Aden in 1538 by treachery, increased the fortifications greatly, and built an aqueduct more than eight miles long through the length of the isthmus, by which the town received an ample supply of water. The ruins of this substantial work still exist. As the power of the Turks gradually declined, the Arabians threw off their yoke, but the time when Aden became free is not precisely known. In 1708 Aden was governed by its own prince. Meanwhile the trade of this place had also gradually declined and had been transferred to Mocha, which is much better situated for the depôt of coffee, the principal production of Yemen. The trade of Aden was limited to its intercourse with Berberah and Zeila, in the country of the Somaulis, whence it received several kinds of gum, myrrh, aloes, libanum, and mastic, as also cattle and sheep, to which it added its own exports, coffee and jowary in small quantities; it imported cotton-cloth, iron, lead, rice, and dates. Since the occupation by the British, its trade with Berberah, Zeila, and Tajurrah has increased, and a number of Banians, Parsees, and other merchants have settled there. It is expected that the whole commerce of the Red Sea, and especially that of Yemen and Hadramaut will soon be transferred to Aden.

(Lord Valentia, *Voyages and Travels to India, &c.*; Captain Haines's *Memoir to accompany a Chart of the South Coast of Arabia, &c.*, in 'London Geogr. Journal,' vol. ix.)

ADERSBACH ROCKS, the name of a remarkable assemblage of freestone rocks, in a valley of the Riesengebirge; it extends, with some interruptions, from the Bohemian village of Adersbach to the mountain Heuscheur, in the Silesian county of Glatz. The summit of this mountain is cut perpendicularly to the depth of from 600 to 1200 feet, and there are only a few paths by which a descent is possible into the labyrinth below, which consists of detached masses of rock of more than 100 feet high, and laid one over another in all directions. Clefts, some larger, some smaller, pierce each of these separate masses, which, from their formation, are affected by change of weather: every shower, every thaw, opens up new paths and clefts, and creates new picturesque forms. Some are as large as moderate-sized houses, and others have the appearance of churches, pyramids, and similar buildings. On following a stream of pure water, which has its source in the centre of the labyrinth, the traveller passes by small crevices through a wall of sandstone of stupendous height, and enters a chaos of isolated columns, walls, towers, and other fragments of rock, of the most extraordinary description, varying in height from 100 to 200 feet. The most remarkable is that which is called 'Der Umgekehrte Zuckerhut,' or 'The inverted Sugarloaf,' which is surrounded by a great number of pillars, which, though only three or four feet in diameter at their bases, are as high as the more massy rocks, and appear like a group of lofty chimneys. This remarkable spot is annually visited by many travellers, and has especially attracted the attention of geologists. It is supposed that the whole, which extends over many square miles, was originally one solid mass of sandstone, which has been split by volcanic action, and afterwards washed out by the waters. (Ersch and Gruber, *Allgemeine Encyclopädie.*)

ADHESION. This term has generally been employed to denote the property by which two solids, a solid and a fluid, two solids and an interposed fluid, or two fluids, remain attached to each other when their surfaces are brought into contact. Adhesion, in some instances, may be considered as little if at all different from cohesion, and dependent upon the same cause; while in other cases, it appears to be connected with, and probably to a considerable extent derived from, chemical affinity; when, for example, two surfaces of lead are pressed together, the adhesion resembles mere

cohesion: it acts at insensible distances like that power, and no change of properties ensues in the metal. If, however, the surface of a piece of lead is put into contact with mercury, the two metals act upon and combine with each other, and an amalgam is produced by chemical affinity. There are other instances in which the adhesion is not distinctly to be referred to cohesion, and in which it certainly does not depend upon chemical affinity, as when a plate of glass adheres to the surface of mercury, or liquids rise in small tubes by capillary attraction.

Disregarding the earlier attempts to determine the force of adhesion, it may suffice to mention that M. Guyton de Morveau found by direct experiments, that when the surfaces of plates of different metals were placed in contact with the surface of mercury, the weights required to separate them from the fluid were as stated in the following table (the metals were pure, the plates circular, one inch diameter, and of equal thicknesses):—

	Grains.		Grains.
Gold . . .	446	Zinc . . .	204
Silver . . .	429	Copper . .	142
Tin . . .	418	Antimony .	126
Lead . . .	397	Iron . . .	115
Bismuth . .	372	Cobalt . .	8
Platina . .	282		

The sixty-third volume of the 'Philosophical Magazine' contains a paper by Mr. Bevan, in which the subject of adhesion appears to be considered in a point of view which had previously excited but little attention, namely, the real force of adhesion of different nails when driven into wood of different species; the weight, without impulse, necessary to force a nail a given depth into wood, and the force required to extract the same when so driven. The term adhesion in this case is applied to the force, whether arising from friction, or cohesion, or partly from both, with which wood resists the drawing out of a nail. Mr. Bevan has given a table of the adhesion, &c. of different kinds of nails when driven into dry Christiania deal; in this table it appears that a sixpenny nail, 73 to the lb., 2½ inches long, forced 8½ inches into the wood, required 327 lbs. weight to extract it; the percussive force required to drive the sixpenny nail to the depth of one inch and a-half into the dry deal, with a cast-iron weight of 6·275 lbs., was four blows or strokes falling freely, the space of 12 inches, and the steady pressure to produce the same effect was 400 lbs. With different kinds of timber the results varied greatly, and Mr. Bevan concludes that a sixpenny nail driven two inches into dry oak, would require a force of more than half a ton to extract it by steady pressure. Mr. Bevan ('Phil. Mag.' and 'Annals of Philosophy' vol. ii., p. 291) has also determined the force required to draw screws out of different kinds of wood; the screws used were about two inches in length, .22 diameter at the exterior of the threads, .15 diameter at the bottom, the depth of the worm or thread being .305, and the number of threads in one inch 12. These screws were passed *through* pieces of wood, exactly half an inch in thickness, and drawn out from the following dry woods by the annexed weights: beech 460 lbs., another specimen 790 lbs., ash 790 lbs., oak 760 lbs., mahogany 770 lbs., elm 655 lbs., sycamore 830 lbs. The force required to draw similar screws out of deal and the softer woods, was about half the above.

ADHESIONS, THEORY OF, is the basis of much of the philosophical part of botany, and forms one of the most striking points of difference between the doctrines of the present and preceding schools. It shows that many of the varied characters, which cause so endless a diversity of appearance in the vegetable kingdom, originate in the adhesion of a few very simple organs; and that what we are accustomed to consider parts of extremely different nature, only seem so in consequence of the way in which such adhesion occurs. Thus, the stem of a tree is not an homogeneous mass of vegetable matter, perforated by holes, or filled by little cavities caused by the extrication of air in it when in a soft state, but is produced by the adhesion of certain elementary bodies called Cellular Tissue, Fibrous Tissue, and Vascular Tissue [TISSUES VEGETABLE], arranged in a definite manner, which varies with species; neither is a leaf, or a fruit, or a flower, a mere mass of pulp, or an expansion, like the horn of an animal, but also consists of these same elementary organs in a state of adhesion. To gardeners it has been long known that the property of adhesion between contiguous parts exists to a certain degree; for the operation of grafting or budding a portion of one plant upon another is dependent upon it. They also know that if two cucumbers, or two apples, or even two hard branches, be artificially placed in contact when in a growing state, they will adhere, so as to become what may be called vegetable twins; and that the same phenomenon sometimes occurs in certain cultivated plants, of which an instance is furnished by the cluster golden pippin apple, whose fruit is usually twin.

(De Candolle, *Théorie Elémentaire de la Botanique;* Lindley's *Introduction to Botany;* Candolle, *Organographie Végétable,* &c.)

ADIA'NTUM (ἀδίαντον), a genus of dorsiferous ferns, so called by the Greeks, because the leaves are of such a nature that water will not readily moisten them. The plant described by Hippocrates and his successors under this name appears to have been the *A. Capillus Veneris*, or the Maiden-Hair fern—a rare European species, occasionally met with on moist rocks and old damp walls, even in this country.

The genus is scattered over all the world from Europe to New Zealand, but is not found in any high latitudes in either hemisphere. By far the greater part of the species inhabit damp tropical woods.

A. Capillus Veneris is a dark-green stemless plant, found in damp, sharp, rocky places, by the side of water-courses, and on the edge of springs, where the air is keen and dry.

Wonderful medicinal properties were once ascribed to this species, but they have long since been discovered to have no existence except in the exaggeration of fanciful practitioners. *Capillaire*

is prepared by pouring boiling syrup upon the leaves of this species, or of *A. pedatum*, an American plant of larger growth and far less divided leaves. A little flavour is afterwards given with orange-flowers.

ADIGE, the Athesis of the Romans, next to the Po the largest river of Italy, rises in the Alps of Tirol above Brixen, and, after passing Roveredo, Verona, and Legnano, falls by several mouths into the Adriatic between the Brenta and the Po. From its rise to Verona, the course is nearly south, and thence almost due east to its mouth, the total length being about 250 miles. It is a deep and rapid river, and below Verona has a width of from 300 to 500 feet, and the neighbouring lands are often injured by its inundations. Its banks have been repeatedly the scenes of military operations in the Italian wars.

ADIP CIRE, a substance so named from *adeps*, fat, and *cera*, wax, because it possesses the properties partly of fat and partly of wax. It is a body of a peculiar nature, being intermediate between fat and wax, and bearing a close resemblance to spermaceti. This name was given by M. Fourcroy in 1786 to the substance in question, which he discovered on examining a piece of human liver that had remained for ten years exposed to the air in the laboratory of M. Poultier de la Salle. In the same year Fourcroy had the opportunity of observing an accumulation of adipocire on a scale of prodigious extent, under circumstances of a peculiar nature, which are highly curious. There was in Paris an immense burial-ground, called Le Cimetière des Innocens. This place had been the receptacle of the dead for a considerable part of the population of Paris for several centuries. On account of some improvements in the neighbourhood it was determined to remove his cemetery. The number of burials in this place had amounted to some thousands annually. The bodies were deposited in pits or trenches about thirty feet deep; each pit was capable of holding from twelve to fifteen thousand bodies; and as the pits became full they were covered with a few feet of earth. The extent of the whole area was about seven thousand square yards, and this space became at last occupied by a mass which consisted almost entirely of animal matter, rising several feet above the general level of the soil. Scientific men were especially charged by the government to direct the precautions requisite for securing the health of the workmen in removing this immense mass of putrefying animal matter; among whom were Fourcroy and Thouret, the latter of whom has given a most interesting account of the circumstances attending the opening of the ground; and the former an analysis of the new and singular object that presented itself for investigation. The most remarkable change was found in the bodies that had been heaped together in the trenches. The first of these trenches opened in the presence of Fourcroy had been closed for fifteen years. The coffins were in good preservation; the covers being removed, the bodies were observed at the bottom, leaving a considerable distance between their surface and the cover, and flattened, as if they had suffered a strong compression; the linen which had covered them was slightly adherent to the bodies; beneath the linen was found nothing but irregular masses of a soft ductile matter of a grey-white colour, resembling common white cheese, the resemblance being more striking from the prints which the threads of the linen had made upon its surface. The bones, which were surrounded by this matter, had no solidity, but were readily broken by sudden pressure. The head was environed with this peculiar matter; the face was no longer distinguishable; the mouth was disorganized; no trace remained of the viscera of the thorax and abdomen, which were all confused together, and converted into this fatty matter; and this was also invariably the case with the brain. None of this matter was found in bodies isolated from each other, but only in those accumulated in the common graves. From various observations it was found that this fatty matter was capable of enduring in these burying-places for thirty or forty years, but that ultimately it became corrupted and was dissipated.

This substance thus presented for examination under such remarkable circumstances, is considered by M. Fourcroy as an ammoniacal soap, formed of a peculiar oil combined with ammonia. Its properties are,—that it melts at about 130° Fahr.; by a strong heat it is decomposed with the solution of ammonia; alcohol acts only slightly upon it at common temperatures, but when boiling dissolves about one-fourth of its weight, the greater part of which separates on cooling in small acicular crystals; lime, potash, and soda decompose it with the solution of ammonia; it is decomposed by nitric acid with the production of nitric oxide, and by sulphuric acid with the development of charcoal. M. Chevreul ('Recherches sur les Corps Gras') finds that adipocire consists of a large quantity of margaric acid, and a small quantity of oleic acid, combined with a little ammonia, potash, and lime.

ADIPOSE SUBSTANCE (*adeps*, fat.); ADIPOSE TISSUE (*Tela adiposa*, Latin; *Tissu graisseux*, French).

Adipose substance, or fat, is an animal oil, which resembles, in its essential properties, the vegetable oils. It is wholly inorganic, though contained in an organized tissue. It varies in its consistence, or rather in the temperature at which it becomes solid. In general, it forms a pretty firm solid, constituting suet, which, when divested of the membrane in which it is contained, is called tallow; but there are animals in which, at the ordinary temperature of the atmosphere, it always remains fluid, as in the cetacea. At the temperature of the human body, it is fluid. It is therefore conceived, that during life it must exist in a fluid or semi-fluid state; though, when observed in the living body, as when incisions are made through the adipose membrane, either in the human subject or in animals, it appears as a soft, yielding, compressible substance, with a slight degree of translucence. There is reason, however, to conclude that this degree of firmness, as well as the general appearance which it exhibits in the living subject, is wholly derived from the organized membrane in which it is contained.

Until modern times, fat was conceived to be a simple principle constituting one of the elements of the animal organization; but M. Chevreul, who examined this substance with extraordinary diligence, has demonstrated that it is not a simple principle, but that it consists of two substances which are capable of being separated from each other, and obtained in a distinct form. Of these substances, one, at the ordinary temperature of the atmosphere, is solid; the other fluid. To the solid substance he gave the name of *stearine*, from στέαρ, fat or suet, and to the fluid substance *elaïne*, from ἔλαιον, oil. Stearine, the solid portion of fat, is a substance colourless, tasteless, nearly inodorous, soluble in alcohol, separable from this solution in the form of small silky needles, and preserving its solidity at a temperature of 99° Fahrenheit. Elaïne, the oily principle of fat, is fluid at the temperature of 60° Fahrenheit; it is of a yellow colour, without odour, lighter than water, its specific gravity being 0.913, and easily soluble in alcohol. The difference in the fluidity, or the melting point of the fat of different animals, depends on the proportions in which these two substances are combined; in the more solid the stearine, in the less consistent the elaïne, being in excess.

There is reason to believe that the fat is immediately formed out of the blood, without any glandular apparatus for secreting it, by the capillary arteries of the adipose vesicles. In the furrow between each packet is placed the branch of an artery and vein. These vessels divide and subdivide to an extreme degree of minuteness, penetrating and terminating in the vesicles of which the packet is composed. In these vesicles the ultimate or capillary arteries separate adipose matter from the blood which is flowing in them, and deposit it in the vesicles. By chemical analysis, the materials of fat, like those of all the other secretions, are found to be contained in the blood, and fat globules are seen in the blood under the microscope.

The function which the adipose substance performs in the animal economy is not very apparent. Being a bad conductor of caloric, it cannot have much influence (though the fat immediately beneath the skin may have some) in maintaining the heat of the body, since the chief portion of it is situated deep in the system, and is placed around the internal viscera. Yet, it certainly accomplishes more than one purpose of no slight importance. 1, In the first place, it is probable that its accumulation in the system serves as a reservoir of inflammable matter for the generation of animal heat, and that it often actually maintains a process of combustion no less than the oil of the lamp. The phenomena of life present nothing more curious and interesting than the provisions which are made for the production and support of animal heat. [HEAT, ANIMAL.] Animal heat is generated by the union of the carbon and hydrogen of the blood with the oxygen of the air, and the consequent formation of carbonic acid and water, the evolution of heat invariably attending the formation of this acid. By the process of digestion chyle is formed; chyle contains a large portion of carbon: this carbon is poured into the great venous trunks of the system, and is immediately carried to the lungs by the great vessel that springs from the right heart. In the lung it is consumed in the formation of carbonic acid gas, for the production of animal heat; and the large supply required for the continual maintenance of this process is, under ordinary circumstances, afforded by the chyle. But suppose this supply to fail; then immediately the absorbent vessels take up, from its various receptacles, the adipose matter accumulated in the system, and convey it to the veins; the veins transmit it to the lung, and thus the lung is supplied with the necessary quantity of carbon for the generation of carbonic acid, and the consequent production of animal heat. 2, In the second place, it serves a most important use in obviating the effects of excessive nutrition. When too much food is taken, or when the secretions and excretions are suppressed, grievous evils would arise, and often death would ensue, if there were no provision for the removal of this superfluous matter. One of the most important of these provisions is the deposition of fat, by which the system is lightened of a burthen; and the circulating system especially is relieved of a fulness and tension of its vessels, which might induce in them a fatal state of action. The secretion of fat from the blood, and the deposition of it in its various receptacles, is thus one of the safety valves of the constitution. The generation of it under circumstances favourable to its formation, that is, under circumstances which put the system in danger, either from the quantity or the quality of the blood, is extremely rapid. In man, no other solid is ever formed so quickly as this sometimes is; but in some animals, in certain states of the atmosphere, a prodigious accumulation of it is said to take place in the course of a few hours. Bichat states that during a fog of twenty-four hours' continuance, thrushes, wheatears, ortolans, and red-breasts, are sometimes observed to become so fat that they are unable to fly from the sportsman.

Sometimes the accumulation of fat is enormous. The average weight of the human body, when well nourished, and of a medium size, is about 160 pounds, or between eleven and twelve stone: yet instances are on record of its attaining, by the deposition of fat, the weight of from thirty-five to forty stone. Dr. Cheyne mentions a case in which the weight was 448 pounds, equal to thirty-two stone. In the 'Philosophical Transactions' are recorded two cases, in one of which the weight was 480 pounds, and in the other 500 pounds. The Breslau Collections contain two other cases, in one of which the weight was 580, and in the other 600 pounds.

ADIT. [MINING.]

A'DJECTIVE, the name of one of the parts of speech, or one of those great classes into which grammarians have distributed the words of a language. The term *adjective*, which is of Latin formation, signifies something that *adds to*; that is, more exactly describes any object. An adjective, in our language, is most commonly prefixed to the name of some thing, to mark some quality by

which it is distinguished from other things belonging to the same class; thus, a *bad* man, a *good* man, a *fat* man, a *troublesome* man; a *black* horse, a *white* horse, &c. Here the terms *man* and *horse* are the most general or abstract terms by which we can express the idea of man or horse; but, by prefixing to them such adjectives as *bad, good,* &c., we limit the class of which we are speaking. Thus, when we speak of a *white* man, we exclude black men, or men of any other colour. In like manner, when we say an *English* man, we limit the signification still further; and in this way we may descend to a Cheshire man, a Chester man, until we come to individuals indicated by a common name, such as Thomson, Smith, &c. By the aid of other words prefixed, such as John, William, &c., we at last come to some certain individual. It appears, then, that in the expressions John Page, William Smith, &c., John and William may be called adjectives as well as the words *black, white,* &c. Frequently *nouns* or names of things can be used like adjectives; thus we can say, a *silver ring,* a *gold stick, salt water, sea water.* Many words in English are, in fact, used both as nouns and adjectives. In the expression 'John's book,' *John's* may be considered as an adjective for the reasons just given. Some grammarians have wished to introduce the term *adnoun* instead of *adjective,* but though the word *adjective* is not a very good name, *adnoun* is no better.

There are two ways in which an adjective can stand in a proposition: we can say 'the horse is bad,' or 'a bad horse.' In the first example, *horse* is called the 'subject,' *is* the 'copula,' or connecting link, and 'bad,' is the 'predicate' or qualifying term. Some words are used both as adjectives and adverbs.

Many adjectives are simple *roots,* such as *good, bad, hot,* &c., while others are formed by adding an affix or suffix to a noun, as play-ful, naugh-ty; other adjectives have affixes derived from the Greek, as adamant-ine; or from the Latin, as station-ary, verb-ose.

ADJUDICATION, in the law of debtor and creditor, in Scotland, is a process for attaching heritable or real property. It is applicable not merely to land and its accessories, but to all rights 'bearing a tract of future time,' as annuities, pensions, lands, &c., and has in general been extended to all such property capable of being applied to the liquidation of debts, as is not attachable by the simpler process of arrestment. According to modern practice, there are two alternatives laid before the debtor in the process —that the debtor is to make over to the creditor land to the value of his debt and one-fifth more, redeemable within five years; or, that the property in general against which the process is directed shall be adjudged to the creditor, liable to be redeemed within ten years, on payment of the debt, interest, &c. The latter is the alternative universally adopted. The lands do not become the absolute property of the adjudger at the end of the ten years without judicial intervention, in 'an action of declarator of expiry of the legal,' in which the debtor may call on the creditor to account for his transactions, and may redeem the property on paying any balance that may be still due.

When there are so many adjudications in process against an estate that it may be considered as bankrupt, while the debtor does not come within the class of persons liable to mercantile bankruptcy, it is usual to sweep all the operations into one process called a 'Judicial Sale and Ranking.' A factor or assignee is appointed, under judicial inspection, and, to a certain extent, but very imperfectly, the property is realized and distributed among the creditors after the manner of a bankrupt estate. (Acts 1681, c. 17; 1695, c. 24; 54 Geo. III. c. 137, ss. 6, 7; Act. Sed. 22nd Nov. 1711; 17th Jan. 1756; 11th July, 1794.) Where sequestration has been awarded against a person liable to mercantile bankruptcy, the award involves an adjudication of the bankrupt's adjudgeable property from the date of the first deliverance. (2 & 3 Vict. c. 41. s. 82.)

The form of an adjudication has long been in use for the completion of defective titles to landed property, and when so employed it is called 'Adjudication in Implement.'

ADJUSTMENT, in Marine Insurance, is the settling and ascertaining the exact amount of indemnity which the party insured is entitled to receive under the policy, after all proper allowances and deductions have been made; and fixing the proportion of that indemnity which each underwriter is liable to bear. The contract of insurance is an agreement to indemnify the insured against such losses as he may sustain by the occurrence of any of the events which are expressly, or by implication of law, contained in the policy. When a ship is lost, or any of those contingencies arise against which the insurance provides, the owner of the ship or of the goods insured, as the case may be, or an authorized agent, reports the circumstance to the insurers or underwriters. The amount of damage being ascertained, the amount which each underwriter has made himself liable to by subscribing the policy, is settled; and this being done, it is usual for one of the underwriters, or their agent, to indorse on the policy, "adjusted a partial loss on this policy of so much per cent." To this indorsement the signature of each underwriter must be affixed, and this process is called the adjustment of the loss. (Selwyn's *Nisi Prius,* title "Insurance;" Park on the *Law of Marine Insurance*).

ADJUTAGE, or AJUTAGE, is a name given to a tube, generally not exceeding a few inches in length, which may be applied to a vessel or reservoir, in order to facilitate the discharge of a fluid from such vessel.

The velocity with which a fluid issues from a very small orifice in the side of a reservoir is equal to that which is due to a body falling in vacuo through the vertical distance of the upper surface of the fluid from the level of the orifice: but the discharge given by this rule must be considerably diminished, when we would estimate that of a fluid through a large aperture, on account of the contraction which takes place in the vein of ef-

fluent water at a short distance from the orifice. The application of a short tube to the orifice increases however the quantity discharged in a given time; and the fact must have been known to the ancients, since Frontinus has a passage indicating such an effect in his treatise 'De Aquæductibus.'

From the experiments of Mr. Vince, it appears that a discharge corresponding to the height of the fluid in a vessel and the area of the contracted vein takes place when the adjutage is a tube less than one inch long; and the reason given is, that a vena contracta is formed in such tube as one would have been formed beyond a simple orifice. But when the tube, whether inserted in the side or in the base of the vessel, is longer than an inch, no contraction takes place, but the effluent particles reaching the interior surface of the tube become adherent to it by a force similar to that which produces the phenomena of capillary contraction; this causes a quantity of fluid to accumulate and completely fill the nearer part of the tube, along which, then, the particles flow in directions nearly parallel to its axis, with nearly equal velocities, those near the surface being carried on with those about the axis, in consequence of the lateral communication which takes place in fluid currents. Atmospheric pressure seems, however, necessary to the production of such effects, since, from the experiments of Venturi and Dr. Matthew Young, the accumulation and increase of discharge in tubes do not take place in a vacuum.

The most remarkable circumstance respecting the discharge of water through adjutages, is that which takes place when the tube consists of two parts, one in the form of a cylinder, and the other a frustum of a cone diverging towards the extremity. The diameter of the cylinder should be equal to that of the contracted vein; and this part must be connected with the reservoir, at the orifice, by a short conic frustum having nearly the form in which the contraction takes place: the two diameters of the frustum, at the opposite extremity, may be to one another as 1 to 1·8, but the length of this part should be equal to nine times the diameter of the cylinder, and the whole length of the tube must not exceed a few inches. The quantity discharged through such a tube was found by Venturi to be, to the quantity discharged through a simple orifice equal in diameter to the cylinder, in the ratio of 24 to 10; and, to the discharge due to the height of the fluid, as 24 to 16. These results have been confirmed by the experiments of Eytelwein and Hachette.

ADJUTANT is a military officer attached to a garrison, a regiment, or a battalion, being usually chosen from among the regimental officers. His duties are to receive all garrison or regimental orders, and promulgate them to the captains of companies in the regiments to which he belongs. Under the major he regulates all the routine of discipline in the regiment or battalion.

ADJUTANT-GENERAL is a military officer on the staff of the commander-in-chief. His duties are to receive the general orders, and cause them to be communicated to the generals of brigade; to receive all reports relating to the state and efficiency of the different regiments, and submit them to the commander-in-chief; and to him all applications of officers for leave of absence must be made. Previously to an action the adjutant-general superintends the drawing up of the infantry.

Besides the adjutant-general of the British army, with the deputy and assistant adjutants-general in London, the regiment of artillery and the corps of marines have each a deputy adjutant-general; the corps of engineers has an assistant adjutant-general, and an officer having the same title is appointed to the northern and midland military district of England. At Dublin there is both a deputy and an assistant adjutant-general, and an assistant adjutant-general is appointed to each military district in Ireland: there is also an assistant adjutant-general for Scotland. An adjutant-general is appointed to the Presidency of Bengal; and the two other presidencies of India have each a deputy adjutant-general. Deputy or assistant adjutants-general are also appointed for Canada, the West India Islands, the Cape of Good Hope, Ceylon, China, New South Wales, and New Zealand.

ADJUTANT or ADJUTANT CRANE.—(*Ciconia argala*, Vigors; *Mycteria argala*, Vieill.; *Leptoptilos argala*.)—This gigantic crane, a native of the warmer parts of India, is closely allied to the Marabou of Africa, but is of larger size, measuring from the tip of the beak to the toes seven feet and a half, and in extent of wing from fourteen to fifteen feet; while, in its ordinary attitude, erect, it stands about five feet in height. Its beak is immensely large and powerful, with a proportionate enlargement of skull and muscularity of neck; and both head and neck are bare of feathers, and only sprinkled with hairs. A large pouch of skin hangs like a dewlap from the lower part of the neck, adding to the bird's uncouth appearance. Its voice is loud and roaring. Its appetite is extremely voracious, and all animal substances, whether fresh or putrescent, are greedily devoured. Vermin of all descriptions, tortoises, lizards, snakes, frogs, small quadrupeds, and birds, constitute its habitual food, together with carrion and other offal matters. These birds are often seen in companies near the mouths of rivers, or along the shore, and in the distance may be easily mistaken for men picking up shells on the beach. In its native regions the argala, like the vulture and hyæna, is serviceable in clearing the fields, lanes, and even streets, of putrescent matters; it is a public scavenger, and as such not only tolerated but even respected in India by the natives, who are indignant against those who molest it. Every thing is swallowed whole; and so accommodating is its throat that a leg of mutton, a hare, a fox, or a cat, are gulped down by one effort. A tortoise, ten inches long, and a large black male cat, entire, were on one occasion found in the stomach of an argala. (Ives's 'Voyage,' p. 184; 'Phil. Trans.' 1813, p. 77.) The bones of its prey are rejected after a time, as is the case with carnivorous birds generally.

In captivity the argala becomes familiar and confident, but it requires to be watched narrowly,

as it seizes upon meat, chickens, fowls prepared for cooking, and other articles of animal food; it is however by no means courageous, its powers and voracity being far superior to its prowess; and it may be repelled even by a child if armed with a switch. (Latham's 'Gen. Hist. of Birds,' ix. 40–41.)

The general colour above of this bird is ash-grey, the under parts white, and the skin of the neck red. The under-tail coverts are delicate flowing plumes of most exquisite texture, and are very valuable, as are also those of the African species (*Leptoptilos Marabou*, Vigors). These plumes are known by the common appellation of *Marabou;* hence has arisen some degree of confusion, Temminck having transferred the title marabou to the Indian species, which has the finest plumes, whereas it is the native Senegal name of the African species; and argala, which he applied to the African species, is the native name of the Indian. This transposition of names is corrected in the appendix to Major Denham's Travels, and the consequent confusion cleared up.

The argala ranges under the order Grallatores. Of its mode of nidification we have no definite accounts.

Adjutant Crane.

ADMINISTRATION and ADMINISTRATOR. An administrator is a person appointed by the ordinary or bishop of the diocese, to make administration of or to distribute the goods and chattels of a person who dies without having made a will. The statute of 31 Edward III. cap. 2, directed the ordinary, in case of intestacy, to depute 'the nearest and most lawful friends' of the deceased, to administer *his* goods; and administrators thus appointed, are put upon the same footing with regard to suits and to accounting, as executors appointed by will: the nearest and most lawful friend of the deceased, denotes the nearest relation by blood who is not under any legal disability. The statute of 21 Henry VIII. c. 5, permits the ordinary to grant administration either to the widow or the next of kin, or to both of them; and, where several persons are equally near of kin, it empowers him to select one of them.

If none of the kindred take out administration, a creditor is permitted to do so; and in the absence of any person entitled to demand letters of administration, the ordinary may appoint as administrator any person whom he may think proper. Administrators are appointed when a will has been made, if no executors are appointed by the will, or if the persons named in it refuse, or are not legally qualified to act; and in any of these cases the administrator only differs from an executor in the name of his office and mode of his appointment. When the executor refuses to act, it is usual to grant administration to the residuary legatee, that is, to the person to whom, by the will, the remainder of the personal property, after payment of debts and legacies, is given.

It is the duty of the administrator to collect all the goods and chattels, to get in the debts, to pay the funeral expenses of the intestate, and the expense of obtaining the letter of administration; and to pay the debts of the intestate, and then to distribute what remains, pursuant to the 'Statute of Distribution,' 29 Car. II. c. 3, and 1 Jas. II. c. 17. The next of kin, among whom either part or the whole of the property may be distributable, are ascertained according to the Roman law. [CONSANGUINITY.] The statute of 29 Charles II. c. 3, confirms the right of the husband to be the administrator of his wife, who dies intestate, and to recover and enjoy her personal property.

Many of the provisions of the 'Statute of Distributions' resembles those of the Roman law of Justinian's period.

(*Novel.* 118; and Gaius, iii., 1, &c. *On the Succession to Intestates' Estates.*) [EXECUTORS.]

ADMIRAL, the title of the highest class of naval officers. The word is said to be merely a corruption of the Arabic *Amir* or *Emir*, a lord or chieftain. Milton wrote *Ammiral* in English, and in Latin *Ammiralatús Curia* (the Court of Admiralty). The French say *Amiral*, and the Italians *Ammiraglio*. The *d* seems to have got into the English word from a notion that Admiral was an abridgment of *Admirable*. The holy wars of the twelfth and thirteenth centuries seem to have introduced the term Admiral into Europe. The Admiral of Sicily is reckoned among the great officers of state in that kingdom in the twelfth century; and the Genoese had also their admiral very soon after this time. In France and England the title appears to have been unknown till the latter part of the thirteenth century: the year 1284 is commonly assigned as the date of the appointment of the first French admiral; and the *Amiral de la Mer du Roy d' Angleterre* is first mentioned in records of the year 1297. Originally, the King of England's admiral of the sea was not necessarily the actual commander of the fleet; he was rather the great officer of state who presided generally over maritime affairs. The duties of the office were,

usually, not to command ships in battle, but merely to superintend and direct the naval strength of the kingdom, and to administer justice in all causes arising on the seas. The former of these duties is now executed by the department of government called the Admiralty, and the latter by the legal tribunal called the High Court of Admiralty.

Anciently, two or more admirals used often to be appointed to exercise their powers along different parts of the coast. There are still a vice-admiral and a rear-admiral of the united kingdom, which places are now sinecures, and are usually bestowed upon naval officers of high standing and eminent services. There is also a vice-admiral of the coast of Yorkshire, a nominal office, usually given to a nobleman. It is the opinion of some writers that the first admiral of all England was appointed in the year 1387. Even the officer bearing this title, however, was not then the person possessing the highest maritime jurisdiction. Above him there was the king's lieutenant on the sea (' locum tenens super mare '). Also, before the term admiral was used at all, there was an officer designated the custos maris, or guardian of the sea.

From the year 1405 (the sixth of Henry IV.) there is an uninterrupted series of lord high admirals of England, the office being always held by an individual, till the 20th of November, 1632, when it was for the first time put in commission; all the great officers of state were the commissioners. During the Commonwealth the affairs of the navy were managed by a committee of Parliament, till Cromwell took the direction of them himself. On the Restoration, the king's brother, the Duke of York, was appointed lord high admiral; and he retained the place till the 22nd of May, 1684, when Charles took it into his own hands. On the duke's accession to the throne, in the beginning of the following year, he declared himself lord high admiral. On the Revolution, the office was again put in commission; and it continued to be held in this form till 1707, when Prince George of Denmark was appointed lord high admiral, with a council of four persons to assist him. On his death, in November, 1708, the Earl of Pembroke was appointed his successor, with a similar council. The earl resigned the office in 1709, since which time till now it has always been in commission, with the exception of the period of about sixteen months (from May, 1827, till September, 1828), during which it was held by King William IV., then Duke of Clarence. The commissioners styled the lords commissioners of the admiralty were formerly seven, and are now six in number; and the first lord is always a member of the cabinet. It is the first lord, indeed, who principally exercises the powers of the office. The patent constituting the commission is issued by writ of privy seal, in the king's name.

Till the reign of Queen Anne the salary of the lord high admiral was only 300 marks; and the emoluments of the place, which were very large, arose chiefly from perquisites, or droits, as they were called, of various descriptions. Prince George of Denmark resigned all these droits into the hands of the crown, and received in their stead a salary of 7000*l.* a year. The salary of the first lord is 4500*l.*, and his official residence is the Admiralty, Whitehall. The salary of the junior lords is 1000*l.*, and they have official residences; or, in case of the government not appropriating to them an official residence, a sum of 200*l.* is allowed instead.

The title of admiral is also given in modern times to naval officers of the highest rank, of which we have in England three classes, namely, admirals of the Red, of the White, and of the Blue. Admirals bear their flag at the main top-gallant-mast head; vice-admirals, at the fore top-gallant-mast head; and rear-admirals, at the mizen top-gallant-mast head. After the union with Scotland, in 1707, the use of the red flag was discontinued, the union-jack being substituted for it; but it was resumed at the naval promotion which took place in 1805, after the battle of Trafalgar. There are also vice-admirals and rear-admirals of each flag, the former ranking with lieutenant-generals, and the latter with major-generals in the army. The number of admirals in each class, in May, 1844, was as follows:—

	Of the Red.	Of the White.	Of the Blue.
Admirals	9	13	14
Vice-Admirals	14	14	18
Rear-Admirals	28	30	38

A full admiral ranks with a general, and an admiral who is actually the commander-in-chief of a fleet with a field-marshal. The title of admiral of the fleet is merely an honorary distinction. According to the official Navy List for April, 1844, there were, in addition to the admiral of the fleet, who receives sea pay of 6*l.* per day, thirty-six admirals with the sea pay of 5*l.* per day; forty-six vice-admirals, with the pay of 4*l.* per day; and ninety-six rear-admirals, with the pay of 3*l.* per day; making 179 admirals; but the number in commission in time of peace is only about twelve. In addition to this pay, every commander-in-chief receives a further sum of 3*l.* per day while his flag shall be flying within the limits of his station.

By an Order in Council, issued in 1700, fifty servants were allowed to the admiral of the fleet; thirty to admirals; twenty to vice-admirals; and fifteen to rear-admirals. The *half-pay* of the admiral of the fleet is at present 1149*l.* 15*s.* per annum; of admirals, 766*l.* 10*s.*; of vice-admirals, 593*l.* 2*s.* 6*d.*; and of rear-admirals, 456*l.* 5*s.* (*Report on Army and Navy Appointments.*)

There is no officer with the title of admiral in the navy of the United States of America, the rank corresponding to it being that of Commodore, which is given to captains commanding on stations.

ADMIRALTY COURTS are courts which have jurisdiction over maritime causes. In England, the Court of Admiralty is held before the Lord High Admiral, or his deputy, who is called the judge of the court. When there was a Lord High Admiral, the judge of the Admiralty usually held his place by patent from him; but when the

office of high admiral is executed by commissioners, he holds his place by commission from the crown under the great seal.

The Court of Admiralty is twofold—the Instance Court and the Prize Court. The commissions to hold these courts are distinct, but are usually given to the same person. Neither of them is a court of record.

The civil jurisdiction of the Instance Court extends generally to marine contracts, that is, to such contracts as are made upon the seas, as where the vessel is pledged during the voyage for necessary repairs; and to some few others, which, though made on land, are executed upon the sea, such as agreements for mariners' wages. But if part of a cause of action arises on the sea and part upon the land, the courts of common law exclude the Admiralty Court from its jurisdiction; and even in contracts made abroad they exercise in most cases a concurrent jurisdiction. The Admiralty Court has no cognizance of contracts under seal, except in those matters in which it has exclusive jurisdiction; as an hypothecation bond, by which a ship is pledged for necessaries furnished to the master and mariners. This security affects only the vessel on which the money is advanced. The Instance Court likewise regulates disputes between part-owners of vessels, and questions relating to salvage. It has also power to inquire into certain injuries committed on the high seas, such as collision, or the running foul of one ship against another, and to assess the damages to be paid to the party injured.

This court is usually held at Doctors'-Commons, near St. Paul's, London. The Admiralty law is composed of such parts of the civil law as treat of maritime affairs, with the laws of Oleron and other maritime laws, and such alterations or amendments as have been introduced by acts of Parliament, or usage which has received the sanction of legal decisions.

In criminal matters the Court of Admiralty has, partly by common law, partly by a variety of statutes, sole cognizance of piracy and all other indictable offences committed either upon the sea or on the coasts, beyond the limits of any English county.

By 7 & 8 Geo. IV. c. 28, all offences tried in the Court of Admiralty are to be punished in the same manner as if committed on land (s. 12). A similar provision is made by 9 Geo. IV. c. 31. In the act for establishing the Central Criminal Court in London (4 Wm. IV. c. 36), the judges are empowered to determine offences committed within the jurisdiction of the Admiralty of England (s. 22). The Admiralty sessions are held twice a year, in March and October, at the Old Bailey. The judge of the Admiralty presides, and two of the common law judges sit with him.

By 3 & 4 Vict. c. 65, which is an act 'to improve the practice and extend the jurisdiction of the High Court of Admiralty of England,' the Dean of Arches is empowered to sit as assistant to or in place of the judge of the court; and advocates, surrogates, and proctors of the Court of Arches are admitted to practise in the Court of Admiralty. The judge of the Admiralty is empowered to

make rules of court, and is to enjoy all the privileges which pertain to the judges of the superior courts. The court can try any questions concerning booty of war which may be referred to it by the Privy Council. It can also adjudicate on claims for services and necessaries to any ships which may not have been on the high seas, but within the body of a county, at the time when such services were rendered. The court can direct issues on questions of fact arising in any suit to be tried before some judge of the superior courts of common law; and is empowered to direct new trials, or to grant or refuse them; the exercise of the last-mentioned right is subject to appeal.

The Prize Court is the only tribunal for deciding what is lawful prize, and for adjudicating upon all matters relating to prize. By 'prize' is understood every acquisition made *jure belli* (by the law of war), which is either itself of a maritime character, or is made, whether at sea or by land, by a naval force. All acquisitions by war belong to the sovereign power in the state, but are usually, by the law of each particular state (as in England by several acts of Parliament), distributed in certain proportions among the persons who took or assisted in taking them. But agreeably to the law of nations, the thing captured is not considered to be taken from the original owners, until, by the sentence of a properly authorized court, it has been condemned as lawful prize. The 3 & 4 Vict. c. 65, enacts that the High Court of Admiralty shall have jurisdiction to decide all matters and questions concerning booty of war, that is, property captured by land-forces, when referred to it by the Privy Council (s. 22). But property captured by the naval force forms the peculiar province of the Prize Court of the Admiralty. 'The end of a Prize Court,' says Lord Mansfield, 'is to suspend the property till condemnation; to punish every sort of misbehaviour in the captors; to restore instantly, if upon the most summary examination there does not appear sufficient ground to condemn; finally, if the goods really are prize, against everybody, giving everybody a fair opportunity of being heard.' (Douglas's 'Reports,' p. 572, &c.) The Prize Court has also jurisdiction in matters of capture in port or on land, when the capture has been effected by a naval force, or a mixed naval and military force.

Vessels taken under the treaties for the suppression of the slave-trade are adjudicated by a mixed commission, composed of English and foreign commissioners.

In 1840 an act was passed (3 & 4 Vict. c. 66) to make provision for the judge, registrar, and marshal of the Court of Admiralty. It fixes the salary of the judge at 4000*l.*, with a retiring pension of 2000*l.* after fifteen years' service or on becoming permanently disabled from performing his duties. The salary of the registrar is 1400*l.*, without fees. The registrar is appointed by the judge, and must be a proctor of not less than ten years' standing. One of the duties of the registrar is to attend the hearing of appeals before the Privy Council, instead of the registrars of the

Court of Chancery, on whom this duty devolved under 3 & 4 Wm. IV. c. 41.

All sovereign states which are engaged in maritime war establish Admiralty Courts, for the trial of prizes taken by virtue of the commissions which they have granted. In determining prize cases, the Admiralty Courts proceed on certain general principles which are recognised among civilized nations. Thus the commission which empowers the Prize Court to determine cases of prize, requires it to 'proceed upon all and all manner of captures, seizures, prizes, and reprisals of ships and goods, which are or shall be taken, and to hear and determine according to the course of the Admiralty and the law of nations.'

The Court of Admiralty for Scotland was abolished by 1 Wm. IV. c. 69. The cases formerly brought before this court are now prosecuted in the Court of Session, or in that of the sheriff, in the same way as ordinary civil causes. The Court of Justiciary has become the tribunal for the decision of the more important maritime offences. The inferior jurisdictions not dependent on the High Court of Admiralty were not abolished by the above act. (Burton's 'Laws of Scotland.') There is an Admiralty Court in Ireland, but a prize commissioner has never been sent to it. By s. 108 in the Corporations Reform Act (5 & 6 Wm. IV. c. 76) all chartered Admiralty jurisdictions were abolished; but that of the Cinque Ports, attached to the office of Lord Warden, was expressly reserved. In several of our colonies there are Courts of Vice-Admiralty. (Stokes, 'On the Colonies,' p. 357.) From the Court of Admiralty in England an appeal lies, in instance causes (whether originating in that court or coming before it by appeal), to the king in council; to which body the powers in maritime as well as ecclesiastical causes were transferred from the High Court of Delegates by 2 & 3 Wm. IV. c. 92. From prize causes, whether in the Vice-Admiralty Courts or in the Court of Admiralty in England, the appeal lies directly to certain commissioners of appeal in prize causes, who are appointed by the king under the great seal.

(Dr. Browne's *View of the Civil Law*, and the *Law of the Admiralty*; and Comyns's *Digest*, tit. 'Admiralty.')

ADMIRALTY, DROITS OF. (DROITS OF THE ADMIRALTY.)

ADMIRALTY ISLAND, on the N.W. coast of North America, is about 80 miles long, and, in some parts, 20 wide: it lies between 57° 2′ and 58° 24′ N. lat., and 134° 52′ and 135° 30′ W. long. The island was circumnavigated by Vancouver, and is about 200 miles in circuit.

ADMIRALTY ISLANDS consist of one large island and about 40 smaller islands, generally classed in the division of Australia. They lie between 2° and 3° S. lat. and 146° 18′, and 147° 46′ E. long.; and were discovered by the Dutch in 1616. The soil and climate are said to be good, but the landing is rendered difficult by reefs and breakers. Some only of the islands seem to be inhabited, and as these islands are very little elevated above the level of the sea, water must necessarily be scarce. The largest island is about 45 miles long, and, like most of them, principally covered with cocoa-nut trees. The inhabitants are well made, of a dark colour, with frizzled hair, and go naked. (D'Entrecasteaux' *Voyage*.)

ADMISSIONS IN A SUIT are those facts or matters necessary to support the case of the plaintiff, or of the defendant, in a suit in equity, the necessity of proving which is removed by the opposite party admitting them.

Admissions are either upon the record or by agreement between the parties.

Admissions upon the record are either *actual*, that is to say, positively contained in the pleadings; or *constructive*, that is to say, to be drawn by necessary inference from the form of the pleadings adopted.

The rules as to admissions upon the record, whereby the necessity of evidence is precluded, are applicable to suits in equity only. (Daniell's *Practice in Chancery*, vol. ii. p. 395, &c., et seq.)

Admissions by agreement between the parties are those which the parties or their attorneys or solicitors agree upon between themselves, for the sake of saving expense or preventing delay. They are usually made in writing, and signed by the parties or their solicitors, but not necessarily so. Agreements for admissions will not be sanctioned by the court, if they violate any known principles of law. Thus, there can be no agreement to admit a wife as a witness for or against her husband, nor to waive an objection to an instrument for want of a stamp. For the same reason that an infant cannot be bound by his answer, he cannot be bound by admissions made on his behalf, unless such admissions are for his benefit.

ADMITTANCE. [COPYHOLD.]

ADO'NIS, in Botany, is a genus of plants belonging to the natural order Ranunculaceæ, and containing many species of very great beauty. The name is merely poetical. Adonis is distinguished from Ranunculus by the want of a little scale at the base of the petals, and from other genera of the order by the numerous hard, dry, sharp-pointed grains of which its fruit consists.

Of the perennial kinds, *A. vernalis*, which is common in gardens in England, is found in a wild state abundantly on all the mountains of middle Europe. Its flowers have from ten to twelve petals of a yellow colour, and of a brilliancy which is rendered the more dazzling by the deep green tuft of finely divided leaves among which they expand. It is only a few inches high, and is one of the early harbingers of spring.

ADOPTION, from the Latin *adoptio*. By the old Roman law, the relation of father and son differed little from that of master and slave. Hence, if a person wished to adopt the son of another, the natural father transferred (mancipated) the boy to him by a formal sale before a competent magistrate, such as the prætor at Rome, and in the provinces before the governor. The father thus conveyed all his paternal rights, and the child, from that moment, became in all legal respects the child of the adoptive father. If the person to be adopted was his own master, (sui juris), the mode of proceeding was by a legislative act of the people in the comitia curiata.

This was called *adrogatio*, from *rogare*, to propose a law. In the case of adrogatio, it was required that the adoptive father should have no children, and that he should have no reasonable hopes of any. In either case the adopted child became subject to the authority of his new father; passed into his family, name, and sacred rites; and was capable of succeeding to his property.

Women could not adopt a child, for by adoption the adopted person came into the power, as it was expressed, of the adopter; and as a woman had not the parental power over her own children, she could not obtain it over those of another by any form of proceeding. Under the emperors it became the practice to effect adrogatio by an imperial rescript, but this practice was not introduced till after the time of Antoninus Pius (A.D. 138-161).

There was also adoption by testament. C. Julius Cæsar the dictator thus adopted his great nephew Octavius, who was thenceforth called Caius Julius Cæsar Octavianus, until he received the appellation of Augustus, by which he is generally known. But this adoption by testament was not a proper adoption, and Augustus had his testamentary adoption confirmed by a lex curiata.

The legislation of Justinian ('Inst.' i. 11) altered the old law of adoption in several respects. It declares that there are two kinds of adoption: one called *adrogatio*, when by a rescript of the emperor (*principali rescripto*) a person adopts another who is free from parental control; the other, when by the authority of the magistrate (*imperio magistratus*) he who is under the control of his parent is made over by that parent to another person, and adopted by him either as his son, his grandson, or a relation in any inferior degree. Females also might be adopted in the same manner. But when a man gave his child to be adopted by a stranger, none of the parental authority passed from the natural to the adoptive father; the only effect was, that the child succeeded to the inheritance of the latter if he died intestate. It was only when the adopter was the child's paternal or maternal grandfather, or otherwise so related to him as that the natural law (naturalia jura) concurred with that of adoption, that the new connection became in all respects the same with the original one. It was also declared that the adopter should in all cases be at least eighteen years older than the person whom he adopted. Women who had lost their own children by death, might by the indulgence of the emperor receive those of others in their place.

Adoption was no part of the old German law: it was introduced into Germany with the Roman law, in the latter part of the middle ages. The general rules concerning adoption in Germany are the same, but there are some variations established by the law of the several states.

The French law of adoption is contained in the eighth title of the first book of the 'Code Civil.' The following are its principal provisions: Adoption is only permitted to persons above the age of fifty, who have neither children nor other legitimate descendants, and are at least fifteen years older than the individual adopted. It can only be exercised in favour of one who has been an object of the adopter's constant care for at least six years during minority, or of one who has saved the life of the adopter in battle, from fire, or from drowning. In the latter cases, the only restriction respecting the age of the parties is, that the adopter shall be older than the adopted, and shall have attained his majority, or his twenty-first year; and if married, that his wife is a consenting party. In every case the party adopted must be of the age of twenty-one. The form is for the two parties to present themselves before the justice of the peace (*juge de paix*) for the place where the adopter resides, and in his presence to pass an act of mutual consent; after which the transaction, before being accounted valid, must be approved of by the tribunal of first instance within whose jurisdiction the domicile of the adopter is. The adopted takes the name of the adopter in addition to his own; and no marriage can take place between the adopter and either the adopted or his descendants, or between two adopted children of the same individual, or between the adopted and any child who may be afterwards born to the adopter, or between the one party and the wife of the other. The adopted acquires no right of succession to the property of any relations of the adopter; but in regard to the property of the adopter himself, it is declared that he shall have precisely the same rights with a child born in wedlock, even although there should be other children born in wedlock after his adoption. It has been decided in the French courts that aliens cannot be adopted.

Adoption is still practised both among the Turks and among other eastern nations. There is no Adoption in the English or Scotch systems of law.

ADOU'R, called by the Roman writers Atur, Aturis, and Aturus, a river in France, which rises in the department of Hautes Pyrenées (the Upper Pyrenees). Its course is first in a northerly direction, past the town of Bagnères de Bigorre; then west, and finally south-west, passing Tarbes, Aire, St. Sever (where it becomes navigable), Dax, and Bayonne. The whole length of the river is about 190 English miles. Many streams from the Pyrenees, as the Gabas, Luy de France, Luy de Béarn, Gave de Pau, and the Bidouze, fall into the Adour on the left bank; the Midouze, and others, on the right. The current is usually rapid, and the melting of the snows on the Pyrenees causes desolating inundations. The Adour falls into the Bay of Biscay, about three miles below Bayonne. It has a bar at the mouth, upon which, at ebb tide, there is sometimes less than three feet water.

ADO'WA, one of the chief places in Abyssinia in the kingdom of Tigré, and in the district of Adowa, which is a part of Tigré proper, 14° 12′ N. lat., 39° 5′ E. long. It is partly on the side and partly at the foot of a hill, an uncommon occurrence in Tigré, where most of the towns are on eminences. The houses are all of a conical form, and arranged pretty regularly in streets. The town is well supplied with water from those

rivulets which fall into the Mareb, and grapes grow well in the gardens. Adowa from its position is the great mart between the coast and the interior provinces, and carries on a considerable trade, which is mostly in the hands of Mohammedan merchants. The population is probably not less than 8000. The chief manufactures of Adowa are coarse and fine cotton cloths, made both of native cotton from the low lands on the Takkazie, and from cotton imported through Massowa on the coast of the Red Sea; the imports and exports are very various, but the most important of the latter are ivory, gold, and slaves. [ABYSSINIA.]

ADO'XA MOSCHATELLINA is a little inconspicuous plant found in woods and groves in all parts of Europe. It is common in the Charlton and Hampstead woods, near London, and in many other places in England.

In English this plant is called the moschatel: it is a pretty interesting plant, much sought after by the curious for the sake of its delicate and modest appearance.

A'DRIA, formerly *Hadria* or *Atria*, an ancient city, situated between the mouths of the Po and the Adige. Under the Roman emperors it was a sea-port town, carried on an extensive trade on the Adriatic, and was a station for the Roman fleet. At a later period, owing to neglect and the operation of physical causes, Adria became joined to the main land, from which it was previously detached, and it is now fourteen miles inland. Adria, though in a state of decay, was never totally destroyed. After many vicissitudes the new town of Adria by degrees arose out of the ruins of the old city, a great part of which had been long before buried under the successive alluvions. Its remains lie to the south of the present town towards Ravegnano, where the old massive walls, and the ruins of an amphitheatre, of baths, aqueducts, mosaic pavements, and other Etruscan and Roman antiquities, are found many feet below the surface of the ground. The present town of Adria is situated on the Castagnaro, a branch of the Adige: it has 10,000 inhabitants, and is a bishop's see, although of late the bishops reside mostly at Rovigo, which is fifteen miles to the westward of it. The territory of Adria borders on the Roman Legation of Ferrara, the town itself being only three miles north of the Po. It has some trade in cattle, grain, silk, flax, firewood, leather, and earthenware. Under the republic of Venice, Adria was annexed to the dogado, or province, of Venice proper, and was governed by a patrician with the title of Podestà, having its own municipal councils and statutes, which were printed in 1707. It now forms part of the Lombardo-Venetian kingdom under the crown of Austria. Adria is 30 miles S.S.W. of Venice, in 45° 3′ N. lat., 11° 1′ E. long.

ADRIAN. [HADRIAN.]

ADRIAN I., Pope, born at Rome, succeeded Stephen III. in 772. Like his predecessor, he had to struggle against the power of the Longobards, who had invaded the provinces bestowed by Pepin, king of the Franks, on the Roman see. Adrian applied to Charlemagne for assistance. The king of the Franks crossed the Alps by the way of Susa, defeated Desiderius, king of the Longobards, and overthrew their kingdom in Italy, in 774. Charlemagne then renewed the grant of the provinces bestowed on the Roman see by Pepin. Adrian died after a long pontificate of nearly twenty-four years, on Christmas-day, 795. Adrian was a man of talent and dexterity; he succeeded in gaining and preserving the friendship of the greatest sovereign of his time, and he used his influence for the security and prosperity of the people of Rome, and its duchy or territory, without at the same time neglecting the spiritual interests of his see.

ADRIAN II., born at Rome, succeeded Nicholas I. in the papal chair, in 867. It was during Adrian's pontificate that Photius, patriarch of Constantinople, withdrew from the Church of Rome, from which time the schism between the Greek and Latin churches dates, which continues to this day. Adrian died in 872, and was succeeded by John VIII.

ADRIAN III., born at Rome, succeeded Marinus in 884, and died the following year.

ADRIAN IV., an Englishman, whose name was Nicholas Breakspeare, succeeded Anastasius IV. in 1154. At the time of his election to the papal chair, Rome was in a very disturbed state. Arnaldo of Brescia, a monk and a disciple of Abelard, had begun to preach a reform in the church as early as 1139, but being driven out of Rome by Pope Innocent II. had taken refuge at Zürich. In 1143, however, he was recalled by the Roman people, who had revolted against Innocent, and had proclaimed a Roman republic, which Arnaldo contributed to constitute. Arnaldo, who was an eloquent man, strongly condemned the temporalities of the church, and wished to restrict the pope's office to mere spiritual matters. Several successive popes, Celestine II., Lucius II., and Eugenius III., kept up a sort of desultory struggle against this popular reformer, whose adherents occasionally committed many acts of violence. Adrian IV., after his election, placed Rome under interdict on account of these disorders, and caused all religious services to cease; which measure led the citizens to banish Arnaldo, who took refuge with some barons of Campania. Frederic of Hohenstauffen, known by the name of Barbarossa, had lately been elected emperor by the German Diet, and was on his way to Rome to be crowned. The pope's legates met him on the road, and demanded that the heretic Arnaldo should be given up by the Viscount of Campania, in order to be tried. His offence had been furiously condemned as political heresy. Arnaldo was brought to Rome, and delivered to the prefect of the city, by whose sentence he was hanged, his body burnt, and the ashes scattered to the winds, in 1155. Meantime Frederic approached Rome with his army. Adrian and the Emperor disputed about the ceremonials of his reception; but after mutual concessions, Frederic proceeded towards Rome. The senate and the people made a more determined opposition to the claims of the emperor to dictate laws to them, and the Romans sallied out and attacked the German soldiers unawares. A general battle

took place, and continued with great slaughter on both sides till night separated the combatants. The city continuing in a disturbed state, both the pope and emperor withdrew to Tivoli, whence Frederic returned towards Lombardy. Disputes of a more serious character than those of ceremonial continued between the pope and the emperor; out of which arose that spirit of bitter hostility between the popes and the house of Hohenstauffen which lasted until the utter extinction of the latter. But the seeds only were sown in Adrian's time. He died in the beginning of September, 1159, and was succeeded by Alexander III.

ADRIAN V., a Genoese, succeeded Innocent in 1276, and died five weeks after his election. He was succeeded by John XX.

ADRIAN VI., born at Utrecht in the Netherlands, of an obscure family, advanced himself by his talents to the post of vice-chancellor of the university of Louvain. The Emperor Maximilian chose him as preceptor to his grandson, afterwards Charles V. Ferdinand of Spain gave him the bishopric of Tortosa. After Ferdinand's death he was co-regent of Spain with Cardinal Ximenes. He was elected pope in 1522, after the death of Leo X., chiefly through the influence of Charles V., whose authority was then spreading over Italy. Adrian endeavoured to reform the numerous abuses of the court and clergy of Rome; he practised a severe economy, and lived frugally. By so doing he displeased the Romans, who had been accustomed to the luxury and prodigality of Leo. He died in September, 1523, and was succeeded by Clement VII.

ADRIAN'S WALL. [ROMAN WALL.]

ADRIANO'PLE, called Edreneh by the Turks, the second city in European Turkey, is in the province of Romania or Rumelia, and on the river Maritza, the ancient Hebrus (navigable for small craft as high as Adrianople), which is here joined by the Toonja and the Arda: it is in 41° 44′ N. lat., 26° 34′ E. long., and 135 miles N.W. of Constantinople. It takes its name from the Roman emperor Hadrian, who restored and embellished it. From 1360 to 1453 it was the occasional residence of several of the Turkish sultans. Adrianople rises gently on the side of a small hill from the banks of the Hebrus and Toonja. The streets of the town are narrow and irregular, but it is well provided with mosques, forty in number, and with baths. The number of inhabitants is about 100,000, of whom one-third are Greeks. One of the mosques, that of Sultan Mourad I., was once a Christian church, and another has a great quantity of porphyry in its construction; but the great boast of the town is the mosque of Selim II., built chiefly of materials brought from the ruins of Famagosta, in Cyprus. It consists of one great apartment like a theatre, terminating in a cupola, and has four regular minarets, to the highest balcony of which there is an ascent by 377 steps. The bazaar of Ali Pacha is also large and handsome. An aqueduct supplies the baths, mosques, and fountains with water. Many traces of Roman building may be seen at Adrianople; and several inscriptions have been lately discovered, as well as the trunk of a colossal statue about 12 feet high. The manufactures of Adrianople are silk, woollen, and cotton stuffs; it has also establishments for dyeing, and distilling rose-water and other perfumes. In the campaign of 1829, the Russians advanced under General Diebitsch as far as Adrianople, when peace was concluded in September 1829. (Balbi, *Abrégé de Géographie;* Ersch and Gruber, *Encyclopädie.*)

ADRIATIC SEA, sometimes called the *Gulf of Venice*, is a large bay of the Mediterranean, which extends from about 40° N. lat. to 45° 46′ N. lat. in a direction from S.E. to N.W., between the coasts of Italy on the west, and of Albania, Dalmatia, Croatia, and Illyria on the east. Its length, from Cape St. Mary to Trieste, is about 550 miles; its average width is more than 100 miles. The most northern part, on the east coast, forms the Gulf of Trieste; and the north-west part is called the Gulf of Venice. The navigation of the Adriatic is easy and safe, the numerous islands on the Dalmatian coast affording excellent shelter in the most violent gales. It has recently become one of the great lines of communication between India and western Europe, by the route through Egypt, steam-vessels passing from Alexandria to Trieste. The Adriatic Sea probably derives its name from the ancient town of Adria. [ADRIA.]

ADULA'RIA, or Moonstone, is a beautiful crystal brought from Mount Adula, in the country of the Grisons, in Switzerland. It is a very pure limpid variety of felspar, and is composed of 64 per cent. of silica, 20 of alumine, 2 of lime, and 14 of potash. A very fine specimen has been sold for as much as 30*l.*

ADU'LE, the ancient name of Zúlla or Thulla, a small place situated in a recess of Annesley Bay, on the coast of Abyssinia, in 15° 35′ N. lat. Adule was the port of Axum, and some ruins in the neighbourhood of Zulla would indicate that it was a place of considerable importance. But the name is chiefly known to us from its connection with a Greek inscription ('Monumentum Adulitanum') which was discovered there by Cosmas, a Christian merchant, who visited the place in the sixth century, and which he has given in his 'Topographia Christiana.' This inscription may be seen in Montfaucon's 'Collectio Nova Patrum,' Paris, 1706, vol. ii.; in Fabricius's 'Bibliotheca Græca,' vol. ii.; and in Chishull's 'Antiquitates Asiaticæ.' The inscription consists of two parts; and no doubt is now entertained that Cosmas made two inscriptions into one. This appears certain from the fact that the two portions refer to two different persons; and the supposition is confirmed by the discovery made by Mr. Salt of an inscription at Axum, which is the same as the latter part of the 'Monumentum Adulitanum.' The first part of the inscription refers to Ptolemy Euergetes, king of Egypt, who is stated to have been supplied 'with elephants from the Troglodytæ and the Ethiopians, which his father, Ptolemy II., and himself first hunted in those regions, and, having taken down to Egypt, adapted to the use of war.' This Ptolemy reigned from B.C. 247 to 222. The second part of the inscription is in the first person, and records the triumphs of some

Ethiopian king, whose name does not appear, over many of the people of Ethiopia and some nations of Arabia: it also describes the country of the Semenæ, now Samen [ABYSSINIA], and records the subjugation of this people. (Clinton's *Fasti*, part ii.)

ADULTERATION (from the Latin *adulteratio*) is the use of ingredients in the production of any article which are cheaper and not so good, or which are not considered so desirable by the consumer as other or genuine ingredients for which they are substituted. The sense of the Latin word is the same. The law does not generally consider adulteration as an offence, but relies apparently on an evil of this nature being corrected by the discrimination and good sense of the public. In Paris, malpractices connected with the adulteration of food are investigated by the Conseil de Salubrité, acting under the authority of the prefect of police. But in this country, where the interests of the revenue are concerned, strict regulations have been resorted to in order to prevent adulteration. Tobacco manufacturers are liable to a penalty of 200*l.* for having in their possession various articles enumerated in the statute, or any substance or material, syrup, liquid, or preparation, matter, or thing, to be used or capable of being used as a substitute for, or to increase the weight of tobacco or snuff (5 & 6 Vict. c. 93, s. 8). Any person engaged in any way in the preparation of articles to imitate or resemble tobacco or snuff, or who shall sell or deliver such articles to any tobacco manufacturer, is also liable to a penalty of 200*l.* (sec. 8). The penalty for actually adulterating tobacco or snuff is 300*l.* (sec. 1); and for having such tobacco or snuff in possession, 200*l.* (sec. 3).

The ingredients used in the adulteration of beer are enumerated in a list of articles which brewers or dealers and retailers in ale and beer are prohibited from having in their possession under a penalty of 200*l.* (56 Geo. III., c. 58, s. 2). By sec. 3 of the same act, a penalty of 500*l.* is imposed upon any chemist, druggist, or other person, who shall sell the articles mentioned in sec. 2 to any brewer or dealer in beer. The penalties against dealers in beer in the above act are extended to beer retailers under 1 Wm. IV., c. 64, and 4 & 5 Wm. IV., c. 85, which acts also contain special provisions against adulteration applicable to this particular class of dealers. [ALEHOUSES.]

Tea, another important article of revenue, is protected from adulteration by several statutes.

The adulteration of coffee and cocoa is punished with heavy penalties under 43 Geo. III., c. 129. The object of sec. 9 of 11 Geo. IV., c. 80, is similar.

The manufacturer, possessor, or seller of adulterated pepper is liable to a penalty of 100*l.* (59 Geo. III., c. 53, s. 22).

In the important article of bread, there are prohibitions against adulteration, though they are probably of very little practical importance. The interference of the Government in this country with the practice of adulteration, except in the case of bread and drugs [APOTHECARIES' COMPANY], has evidently had no other object than the improvement of the revenue.

ADULTERY (from the Latin *adulterium*) according to English law is the sexual connection of any man with another man's wife; or of a married man with an unmarried woman.

Adultery was punished by the Jewish law with death; but the adultery which by the Mosaic law constituted a capital crime was only the sexual connection of a wife with any other man than her husband. By the Athenian law, the husband might kill the adulterer, if he detected him in the act of dishonouring him. (Lysias, *Oration on the Death of Eralosthenes.*)

By the Romans adultery was defined to be 'sexual intercourse with another man's wife.' It was adultery, whether the male was married or not; but the sexual connection of any man with a woman who was not married, was not adultery. The Julia Lex (Dig. 48. tit. 5; Paulus, *Sentent. Recept.* ii. 26) on adultery, which was passed in the time of Augustus (about B.C. 17), allowed the father, whether the natural or adoptive father, to kill the adulterer and adulteress in certain cases which were laid down by the law; the husband also could in certain cases kill the adulterer when he caught him in the act, but not the wife. Sixty days were allowed for the husband or the father, in whose power the adulteress was, for commencing legal proceedings. It appears from the terms of the law that the sixty days were to be reckoned from the day of divorce, and the husband was bound to divorce his wife as soon as the fact of the adultery was known to him. After the sixty days were expired, any other person might accuse the adulteress. A wife convicted of adultery lost half of her dos, and the third part of any other property that she had, and was banished (relegata) to some miserable island. [MARRIAGE, ROMAN.] The adulterer lost half of his property, and was also banished. A constitution of Constantine (*Cod.* ix. tit. 39) made adultery a capital offence in the male. Justinian (*Novel.* 134. c. 10) confirmed the legislation of Constantine, and added confinement in a convent as the punishment of the adulteress, after she had been whipped.

By the canon law, adultery is defined to be the violation of conjugal fidelity; and the incontinence of the wife and husband is now considered as equally criminal in most Christian countries.

During the Commonwealth, adultery, in either sex, was made a capital felony in England (Scobel's *Acts*, part ii. p. 121), but at the Restoration this law was discontinued. At present a man may maintain an action against the seducer of his wife, in which he may recover damages as a compensation for the loss of her services and affections (Selwyn's *Nisi Prius*, title 'Adultery'); but the wife has no remedy by the common or statute law in case of the husband's adultery. Her only remedy is in the Ecclesiastical Courts, where she can obtain a separation from her husband. The husband, after obtaining a verdict against the adulterer in a court of law, and a sentence of separation by the Ecclesiastical Court, may obtain a divorce from his wife by Act of Parliament. [DIVORCE.]

In Scotland, the Act 1563, c. 74, punished the notorious and habitual adulterer, man or woman, with death. The latest instance of sentence of death in Scotland for adultery is perhaps that of Margaret Thomson, May 28, 1677. All the statutes on the subject have, according to the peculiar practice of Scotland, expired by long desuetude.. In the seventeenth and the commencement of the eighteenth century, the church courts were very active in requiring the civil magistrate to adjudicate in this offence; but this means of punishment was abolished by the 10th Anne, c. 7, s. 10, which prohibited civil magistrates from giving effect to ecclesiastical censures. Of late years the doctrine has been admitted by Scottish lawyers, that the seduction of a wife is a good ground for an action of damages; but such prosecutions are wholly unknown in practice. Adultery is a good ground for an action of divorce. (Hume *On Crimes*, i. 452–458; Stair's *Institute*, b. i., tit. 4, s. 7; Erskine's *Institute*, b. i., tit. 6, s. 43.)

The French law (*Code Pénal*, 324) makes it excusable homicide if the husband kills the wife and the adulterer in the act of adultery in his own house. The punishment of a woman convicted of adultery is imprisonment for not less than three months, and not exceeding two years; but the prosecution can only be instituted at the suit of the husband; and the sentence may be abated on his consenting to take back the wife (s. 337). The paramour of a wife convicted of adultery is liable to imprisonment for not less than three months, or for a period not exceeding two years; and to a penalty of not less than 100 francs, or not exceeding 2000 francs (s. 338).

In the State of New York, the Court of Chancery is empowered to pronounce a complete divorce in the case of adultery, and in no other case, upon the complaint either of the husband or the wife. The process is by bill filed by the complaining party. If a divorce is pronounced, the defendant is disabled from marrying during the lifetime of the other party.

ADVENT, literally the approach or coming, is the space of four weeks preceding Christmas, appointed in the English and other Christian churches to be kept holy in celebration of the approach of our Saviour's nativity or manifestation. The first Sunday in Advent, commonly called Advent Sunday, is now the Sunday, whether before or after, which falls nearest to St. Andrew's day (the 30th of November).

ADVENTURE BAY is situated on the south-east coast of New Holland, 43° 21′ S. lat., 147° 29′ E. long. The anchorage is good and well sheltered, and the neighbouring shore furnishes abundance of wood and water, which are easily procured. At the head of the bay is a beautiful sandy beach, two miles long, and behind this beach a level plain, containing a lake with brackish water, where abundance of bream and trout are found. The shores of the bay in other parts are hilly, and the whole district is thickly wooded. The spot is occasionally visited by some of the wandering aborigines of the island. The animal principally found in these wilds is the kangaroo, in hunting which the natives show considerable activity. Brown hawks, crows, parroquets, pigeons, and a variety of small birds, frequent the woods, which are infested by large black snakes and lizards. Insects are very numerous; among these are musquitoes and a large black ant, the pain of whose bite is intolerable for a short time. The bay is visited periodically by an abundance of fish of various kinds. Adventure Bay was discovered by Captain Furneaux in 1773, and named from his ship the Adventure, which formed part of the expedition under Captain Cook, who visited the bay in 1777. Captain Bligh put in here in 1788 and 1792, for the purpose of obtaining wood and water. (Cook's *Third Voyage*, vol. i.; Flinders' *Voyage*, vol. i.; Bligh's *Voyage to the South Seas*.)

ADVERB, the name given to a class of words employed with verbs, adjectives, &c., for the purpose of qualifying their meaning, just as the adjective is attached to substantives. In the English language a very large number of adverbs are distinguished by the termination *ly*, which in the Anglo-Saxon has the fuller form *lice*, and in German, *lich*. Our own language possesses the same suffix in the form *like*, as *godlike*. These, however, and many other words in *ly* are adjectives, as *manly*, *ugly*; and it is difficult to draw the line between these two classes, many words, especially in the older writers, being used indifferently for both [ADJECTIVE]. The word to which the adverbial suffix *ly* is added is generally an adjective, but occasionally the adjective has become obsolete in the present form of our language, and must be sought in the Anglo-Saxon. Thus *early* is derived from the Anglo-Saxon *aer*, which indeed still appears in the poetical forms *ere*, and the superlative *erst*. But though the termination *ly* is derived from the Teutonic portion of our language, it has been applied most freely to adjectives of Latin origin, as *publicly*, *privately*; and with these may be classed the adverbs from adjectives in *ble*, as *horribly*, *agreeably*, in which the liquid belongs at once to the adjective and the suffix. A class of adverbs is formed by prefixing the old Saxon preposition *an* or *on* to nouns, in which a careless pronunciation afterwards left nothing but the vowel *a*, as *on foot*, now *afoot*.

ADVERTISEMENT (from the French *avertissement*, which properly signifies a giving notice, or the announcement, of some fact or facts). In the English, Scotch, and Irish newspapers, and other periodical works, there are annually published above two millions of announcements known by the name Advertisement. The duty on a single advertisement was formerly 3*s.* 6*d.* in Great Britain, and 2*s.* 6*d.* in Ireland; but by 3 & 4 Wm. IV., c. 23, it was reduced to 1*s.* 6*d.* in Great Britain, and 1*s.* in Ireland. In the year previous to this reduction the total number of newspaper advertisements published in the United Kingdom was 921,943; namely, 787,649 in England, 108,914 in Scotland, and 125,380 in Ireland. The duty amounted to 172,570*l.*, and had been stationary for several years. In 1841 the number of advertisements had increased to 1,778,957; namely 1,386,625 for England and Wales (653,615 in

London, and 733,010 in provincial newspapers), 188,189 in Scotland, and 204,143 in Ireland. The total amount of duty was 128,318*l.*; and it has progressively increased from the time when the reduction took place, so that there is little doubt of its producing, in time, as large a revenue as it did at the higher rate. The size of newspapers has been doubled in many instances, to allow of the insertion of a greater number of advertisements. Advertisements generally supply the fund out of which newspapers are supported, as the price at which the newspaper is sold is insufficient to pay the cost of the stamp, the paper, the printing, and the cost of management. The lowest price of an advertisement in a London daily newspaper is now 5*s.* (except applications for places by servants, which, in the last page of the 'Times,' are 3*s.* 6*d.*), which includes the duty: such advertisement must not exceed five lines. The usual practice is to charge 6*d.* per line for each line above four; but when the number of lines exceeds about twenty lines, the rate of charge is increased, the longest advertisements being charged at the highest rate. The duty on short advertisements constitutes a tax of 66 per cent. If the duty were abolished, the minimum price of advertisements would probably be 1*s.* in all but a few papers. In our complicated state of society every facility should be given to the only effectual means of informing the public of new improvements, inventions, and other things calculated to promote the public advantage. The yearly number of advertisements in the United States, where no duty on them exists, is said to exceed 10,000,000.

A printed copy of every pamphlet or paper (not a newspaper) containing advertisements must be brought to the Stamp-Office to be entered, and the duty thereon to be paid, under a penalty of 20*l.* (s. 21, 6 & 7 Wm. IV. c. 76).

ADVOCATE, from the Latin *advocātus*. The origin of advocates in Rome was derived from an early institution, by which every head of a patrician house had a number of dependants, who looked up to him as a protector, and in return owed him certain obligations. This was the relation of patron and client (*patrónus, cliens*). It was one of the principal and most ordinary duties of the patron to explain gratuitously the law to his client, and to assist him in his suits.

Though the word advocate is now frequently used to express a person conversant with the law, who manages a client's case in court, this is not the meaning of the Roman word Advocatus. The word Advocatus, as the etymology of the word implies (*advocare*, to call to one's aid), was any person who gave another his aid in any business, as a witness, for instance, or otherwise. It was also used in a more restricted sense to signify a person who gave his advice or aid in the management of a cause; but the Advocatus of the republican period was not the modern Advocate. He who made the speech for plaintiff or defendant was termed Orator or Patronus. Ulpian, who wrote in the beginning of the third century A.D., defines Advocatus to be one who assisted another in the conduct of a suit ('Dig.' 50, tit. 13). Under the Empire indeed we find Advocatus sometimes used as synonymous with Orator. The Emperor Hadrian established an Advocatus Fisci, whose functions were to look after the interests of the Fiscus, or the imperial revenue.

In countries where the Roman law prevails in any degree, the pleaders in courts of justice are still called advocates, but their character and duties vary under different governments. [ADVOCATES, FACULTY OF; AVOCAT.]

Advocates in English courts are usually termed COUNSEL.

The Lord Advocate, or King's Advocate, is the principal crown lawyer in Scotland. [ADVOCATE, LORD.]

ADVOCATE, LORD, is the name given to the principal public prosecutor in Scotland. He is assisted by a solicitor-general and some junior counsel, generally four in number, who are termed Advocates Depute. He is understood to have the power of appearing as prosecutor in any court in Scotland where any person can be tried for an offence, or to appear in any action where the crown is interested: but it is not usual for him to act in the inferior courts, which have their respective public prosecutors, called procurators fiscal, who act under his instructions. The procurator fiscal generally makes the preliminary inquiries as to crimes committed in his district; and after transmitting the papers to the Lord Advocate, he, or one of his assistants, either directs the case to be prosecuted at his own instance before the superior court, or leaves it to the conduct of the procurator fiscal in the inferior court. When a private party prosecutes, it is the practice for him to obtain the concurrence of the Lord Advocate. The Lord Advocate sat in the Scottish Parliament in virtue of his office, as one of the officers of state. He is usually in the commission of the peace. The Lord Advocate, like any other party to a cause, never acts as a magistrate in his own person, but obtains such warrants as he may require from the Court of Justiciary. He and his assistants are always members of the ministerial party, and, much to the detriment of the public police business of the country, it is their practice all to resign when there is a change of ministers. The Lord Advocate is virtually Secretary of State for Scotland. His duties in this capacity are multifarious, and the extent of his power is not very clearly defined.

ADVOCATES, FACULTY *OF*. The Faculty of Advocates in Edinburgh constitute the bar of Scotland. It consists of about 400 members, but only a small proportion are practising lawyers; and it is now usual for country gentlemen to acquire the title of advocate, in preference to taking a degree at the Scottish universities. The members may plead before any court in Scotland where the intervention of counsel is not prohibited by statute, in the House of Lords, and in parliamentary committees. Their claim to act as counsel is generally admitted in the colonial courts; and in those colonies where the civil law is in use, such as the Cape of Good Hope and the Mauritius, it is usual for those colonists who wish to hold rank as barristers to become members of the Faculty of

Advocates. A candidate is examined in Justinian's 'Institutes,' and required to translate any passage in the 'Pandects.' After the lapse of a year he is examined in Scottish law. He then prints and defends theses on a title of the 'Pandects,' after the method formerly followed in the universities, and still preserved in some of them. Being admitted by ballot by those members of Faculty who attend the impugnment, the candidate, on taking the oaths, receives an act of admission from the Court of Session. The expense of becoming a member of the Faculty, including stamp duty, subscription to the widows' fund, the subscription to the library, &c., amounts to about 350*l*. The Faculty choose a dean or chairman by an annual vote. The Dean of Faculty and the two crown lawyers, the Lord Advocate and Solicitor-General, are the only persons who take precedence at the Scottish bar, independent of seniority. The Lord Advocate and the Solicitor-General are the only members of the Faculty who wear silk gowns and sit within the bar.

ADVOCATES' LIBRARY. The idea of establishing a library for the use of the Faculty of Advocates in Scotland, seems first to have been entertained a few years before the Revolution. The author and active promoter of the plan was Sir George Mackenzie, of Rosehaugh. The plan was adopted by the Faculty of Advocates in 1684 or 1685 according to one authority; in 1680 according to another. Although the Advocates' Library, strictly speaking, belonged to the Faculty of Advocates as an exclusive body, it still was early considered as a public library, and was open to the public. This characteristic has rendered the institution very popular, and at the same time promoted its increase. In the year 1700 the greater part of the collection was consumed by fire. In the eighth year of Queen Anne it obtained the privilege of receiving a copy of every new book.

The whole number of volumes now contained in the library is estimated not to exceed 150,000. Still the Advocates' Library is by far the largest and also the most valuable in Scotland. In Great Britain there are probably only two libraries, viz. the British Museum and the Bodleian, that outnumber it.

As to ease of access, there is no public institution in Great Britain, and very few in Europe, managed with greater liberality than the Advocates' Library. Any stranger arriving in Edinburgh is admitted without introduction; but some introduction is required for habitually resorting to and reading in the library. Even borrowing of books is subject to very slight restriction.

While the Court of Session sits, the Advocates' Library opens at nine o'clock in the morning, and shuts at four o'clock, p. m.: during vacation it is open from ten till four.

ADVOCATION, in the law of Scotland, is the name of a process by which an action may be carried from an inferior to a superior court, before final judgment in the former. Advocations are regulated by the 1 & 2 Vict. c. 86.

ADVOWSON is the right of presenting a fit person to the bishop, to be instituted to a benefice within the diocese which has become vacant The person who has this right is called the patron (*patronus, advocatus*) of the church, and the right is termed an advowson (*advocatio*), because the patron is bound to advocate or protect the rights of the church and of the incumbent whom he has presented.

The bishop may reject the individual presented to him, but the cause of rejection may be examined at the instance either of the clergyman presented, or of the patron, by process in the ecclesiastical and temporal courts.

The patron was originally the founder of a church or other ecclesiastical establishment, he who built the church, gave the ground for it, and endowed it with lands; and his heirs had the right of presentation. The bishop was the judge of the qualification of the person who was presented. (Du Cange, 'Gloss.,' tit. 'Advocatus,' 'Patronus.')

An advowson which has been immemorially annexed to a manor is called an *advowson appendant*, and is transferable by any conveyance which will transfer the manor itself. It may, however, be detached from the manor, and is then termed an *advowson in gross*.

An advowson may be transferred by sale, by will, or otherwise, and is available to creditors in satisfaction of the debts of the patron. It may be aliened for ever, or for life, or for a term of years; or the owner may grant any number of successive rights of presentation on future vacancies. But, in order to prevent a corrupt presentation, the immediate right to present is not an object of sale when a vacancy has actually occurred; and a purchase of it during the mortal sickness of the incumbent is also prohibited.

When the proprietor of an advowson exercises his patronage, three persons are concerned; the proprietor, the clergyman who is presented, and the bishop in whose diocese the living is situated, or the *patron*, the *clerk*, and the *ordinary*. The presentation is usually a writing addressed to the bishop, which states that the party presenting is the patron of a church which has become vacant, and requests the bishop to admit, institute, and induct a certain individual into that church, with all its rights and appurtenances. Twenty-eight days are allowed to the bishop for examining the competency of the candidate, and at the expiration of that time he is admitted and instituted to the benefice by formal words of institution read to him by the bishop, from an instrument to which the episcopal seal is appended. A mandate is then issued to the archdeacon or other officer to *induct*, *i.e.* to put the new incumbent into the actual possession of the church; and his title as legal *parson* is complete.

Sometimes two of the three characters of patron, clerk, and bishop (or ordinary), are united in one person. Thus the bishop may himself be the patron; in which case institution alone is necessary. The bishop is then said to *collate* the clergyman to the benefice, and the advowson is said to be *collative*.

If the clerk is the patron, he cannot present himself, but he may pray to be admitted by the

bishop; or he may transfer to another the right of presentation before the vacancy occurs, and then procure himself to be presented.

Another instance in which the patronage and the parsonage are united is in *appropriations*, where, by the concurrence of all parties interested, the advowson, together with the church, its revenues, and appurtenances, have in former times been conveyed to some ecclesiastical body, who thus became both the patrons and perpetual incumbents of the living, and by whom the immediate duties of cure were devolved on a *vicar* or a stipendiary *curate*.

On the dissolution of the monasteries these parsonages or rectories, as they are called, were vested in the king, who granted many of these to laymen, who still possess them, and are called lay impropriators. [BENEFICE.]

In some advowsons the patrons have power to appoint an incumbent without the approbation of the bishop. These are called *donative* advowsons, because the patron exercises the direct privilege of *giving* his church to a clerk selected by himself.

Sometimes the *nomination* is distinct from the right to present: thus, the owner of an advowson may grant to another the right to nominate a clergyman, whom the grantor and his heirs shall be thereupon bound to present.

If, upon the vacancy of a living, no successor, or an insufficient one, shall be presented, it is put under *sequestration* by the bishop, who provides for the spiritual wants of the parish by a temporary appointment, and secures the profits of the benefice, after deducting expenses, until another incumbent shall be duly inducted. After a vacancy of six months, occasioned by the default of the patron, the right to present *lapses* to the bishop himself. On a similar default by him, it devolves to the archbishop, and from him again to the king; the period of six calendar months is allowed to pass in each case before the right is forfeited to the superior. In the case of a donative, the right never lapses by reason of a continued vacancy, but the patron is compellable to fill it up by the censures of the Ecclesiastical Court.

When the incumbent of a living is promoted to a bishopric, it is thereby vacated, and the king has a right to present to it, for that turn, in lieu of the proprietor of the advowson.

If a man marries a female patron, and a vacancy happens, he may present in the name of himself and wife.

When the patron dies during a vacancy, the right to present devolves on his executors, and not on his heir; but if the patron happens also to be the incumbent, his heir, and not his executor, is entitled to present.

Where the patron is a lunatic, the Lord Chancellor presents in his stead; and he usually exercises his right in favour of some member of the lunatic's family.

An infant may present to a living in his patronage, and his hand may be guided in signing the instrument. (Burn's *Eccles. Law*, tit. *Advowson, Benefice, Donative;* Selden's *History of Tithes;* Gibson's *Codex*, vol. ii.; BENEFICE.)

ADVOWSONS, VALUE OF.—The following rules give the *very highest value* of an advowson, and any purchaser should think twice before he gives as much as is found by them.

To find the value of the perpetual advowson of a living producing 1000*l.* a year, the present incumbent being forty-five years of age, and money making four per cent., we must first find how many years' purchase the incumbent's life is worth, and here we recommend the use of the Government or Carlisle Tables. Taking the latter, we find the annuity on a life of forty-five, at four per cent., to be worth fourteen and one-tenth years' purchase; but at four per cent., any sum to be continued annually for ever is worth twenty-five years' purchase. The difference is ten and nine-tenths years' purchase, or, for 1000*l.* a year, 10,900*l.*, which is the value of the advowson.

In finding the value of the next presentation only, other things remaining the same, the seller will presume that the buyer means to make the best of his bargain by putting in the youngest life that the laws will allow, that is, one aged twenty-four. The value of an annuity on such a life, at four per cent., according to the Carlisle Tables, is seventeen and eight-tenths years' purchase. And as we are giving the highest possible value of the advowson, omitting no circumstance which can increase it, we will suppose the next incumbent to come into a year's profits of the living immediately on his taking possession. The rule is this:—Take four per cent. of the value of the present incumbent's life, or $14{\cdot}1 \times {\cdot}04$, which gives ·564; subtract this from 1, which gives ·436; divide by 1 increased by the rate per cent., or 1·04, which gives ·419; add one year's purchase to the presumed value of the next incumbent's life (17·8), which gives 18·8, multiply this by the last result, ·419, which gives $18{\cdot}8 \times {\cdot}419$, or 7.88 nearly—the number of years' purchase which the next presentation is now worth—which, if the living be 1000*l.* a year, is 7880*l.*

For the Carlisle Table of Annuities, see Milne *On Annuities*, vol. ii. p. 595. For the Government Tables, see Mr. Finlaison's *Report to the House of Commons*, ordered to be printed 31st March, 1829, page 58, column 6.

A'DYTUM (ἄδυτον), a Greek term signifying a place that may not be entered, is applied to the innermost and secret chamber of a temple. In the ancient Egyptian temple, the Adytum is placed at the end of a series of propylæa, porticoes, and vestibules, and surrounded by galleries and chambers, which afforded every facility for concealing the mysteries of the interior. There is no corresponding arrangement in the Greek and Roman temples, with one or two doubtful exceptions. The 'most holy place,' or the Sanctum Sanctorum, the holy of holies, was the adytum of the temple of Solomon at Jerusalem, which may reasonably be believed to have been built in the form and after the manner of the temples of the Egyptians.

ÆCI'DIUM, a genus of minute parasitic plants, belonging to the natural order Fungi, found in great abundance in this and other northern coun-

tries. By some modern writers it has been combined with Uredo and others; but it appears distinctly characterized by its enveloping membrane, having a tubular form, and being altogether distinct from the cuticle of the plant on which it grows.

The species are universally parasitic upon the leaves, or flowers, or bark of living plants, where they are generated beneath the cuticle. Their structure is of the most simple kind; consisting of nothing more than a little mass of excessively minute sporules, or reproductive particles, much smaller than the finest sand, inclosed in a thin bag, of either a fibrous or reticulated structure, which in time pierces the cuticle under which it lies, gradually assumes a tubular appearance, and finally bursts at the apex for the purpose of enabling the sporules to escape.

A great many species are found upon the weeds and trees of Europe, varying in colour, size, and form. Of these the two following are among the most common.

Æcidium cancellatum, the Pear Æcidium, which is often very common, in the latter months of autumn, on the back of the leaves of the cultivated pear-tree, to which it gives a singularly warted aspect.

Æcidium Berbéridis, the Barberry Blight. The bright orange powder that collects upon the leaves and flowers of the common barberry consists of the sporules of this species, which are discharged from thousands of little tubular apertures, that spread in patches over all the tender parts.

ÆDI'LES, Roman magistrates, who are said to have been called Ædiles because they had the care of the temple (ædes) of Ceres. The ædiles were first appointed B.C. 494, and elected from the plebes or commonalty; and at first they were the officers of the tribunes. These were the plebeian ædiles. The two ædiles called curule, were first elected B.C. 365 (Livy, vi. 42). The curule ædiles had the higher rank; and they alone of the ædiles had authority to make general rules applicable to the administration of their office (Gaius, i. 6). It is not easy to distinguish the functions of the two classes of ædiles. Generally, they had the care of the temples, baths, porticoes, aqueducts, sewers, and roads of the city; and they presided at the religious celebrations, of which theatrical exhibitions formed an important part. There were other duties connected with the office of ædile, such as the inspection of the markets, the examination of weights and measures, and the general regulation of sales ('Dig.' 21, tit. 1). The curule ædileship was the second in the series of honours through which the Roman candidate proceeded to the consulship. In B.C. 45 C. Julius Cæsar established two more plebeian ædiles, whose business was to look after the supply of corn. The office of ædile was known also in the municipal towns of Italy.

ÆGA'GRE (*Capra Ægágrus*, Gmel.), a species of wild goat, or ibex, which inhabits, in troops, the mountains of eastern Europe and of Persia, where it is called *Paseng*. The oriental bezoar, or calcareous concretion, is sometimes found in its stomach, as in that of other ruminants. These stones were once supposed to possess medicinal virtues, and were in repute both in Europe and the east. [BEZOAR; GOAT.]

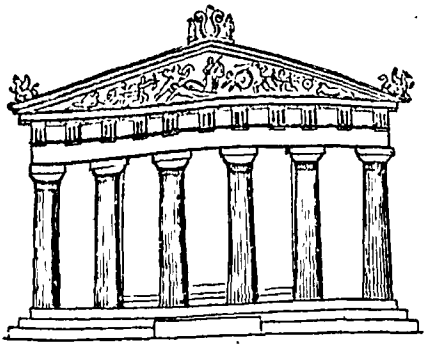
ÆGE'AN SEA is the name given by the Greek and Roman writers to that part of the Mediterranean, which is now called the Archipelago. [ARCHIPELAGO, GRECIAN.]

ÆGI'NA, a small island in the Gulf of Ægina, which retains its ancient name with little alteration. The 37° 47′ N. lat. passes through the northern extremity of the island. It forms a part of the modern kingdom of Greece.

The western part of the island is a stony plain, which however produces corn. A hill called St. Elias, or Oros, and its offsets, occupy the southern part of the island: on the north-eastern part is a ridge, on one of the eminences of which are the remains of the ancient temple of Zeus (Jupiter) Panhellenius. The site of the ancient town is shown on the north-west coast, by the remains of two artificial harbours. The walls on the land side, which were about ten feet thick, can be traced through their whole extent. There were probably three principal gates, the central one leading to the eminence in the eastern part of the island, on which the remains of the temple of Jupiter Panhellenius stand. This temple is situated amidst pine trees, on the summit of a mountain, and separated by a narrow valley from the hill on which the modern town of Eghina stands. The position of this edifice is striking. Placed in the middle of the Gulf of Eghina, it offers a panoramic prospect of the whole bay. Athens and its Acropolis are 18 miles distant N.N.E., and the towering Acropolis of Corinth 37 miles to the N.W. (Leake's *Morea*, 1830.)

The history of Ægina is one of the instances of the wealth and power which a small territory may attain by a favourable situation and by commerce. It was occupied by the Achæi (Homer, 'Iliad,' ii. 562), and afterwards by Dorians from Argos. In B.C. 563 Ægina had a factory for trade in Egypt (Herodotus, ii. 178), and the island was one of the great emporiums of the Mediterranean, which could not be owing to any other circumstances than its position and the security which property must have had there. In B.C. 480 (Herodotus, vii. 147) there was an active trade in grain between the corn countries on the Black Sea and the Peloponnesus and Ægina. The island had at an early period a silver coinage; the common type on one side of which is a sea-tortoise. In the great invasion of Xerxes (B.C. 480) the people of Ægina took a brilliant part in the great naval fight of Salamis, to which they sent thirty ships. After the Persian wars the old jealousy of Athens and Ægina was revived, and finally in B.C. 431 the Athenians took possession of the island and expelled the people (Thucydides, ii. 27). A remnant of them was restored by the Spartan Lysander at the close of the Peloponnesian war, B.C. 404; but Ægina never recovered its importance. Servius Sulpicius, a distinguished contemporary of Cicero, mentions Ægina as one of the examples of fallen greatness. (Cicero, *Ad Diversos*, iv. 5.)

The temple of Jupiter Panhellenius, before referred to, or the Panhellénium of Ægina, as it is



Front Elevation of the Temple of Ægina, as restored.

often called, was of the Greek Doric style or order, and of the arrangement which is technically termed hexastyle, peripteral, and hypæthral; that is, it had a portico of six columns at each end, and ranges of twelve columns along each side, the columns on the angles being counted both in flank and in front: internally it was divided into what may be termed nave and aisles, by two ranges of columns, the space between which was uncovered. The cell or body of the temple was a regular parallelogram, inclosed by four walls: access was given to the interior by doors in the cross-walls, from inner porticoes formed by the longitudinal extension of the flank walls, the projecting shoulders of which are termed antæ, and between which two columns stand, thus forming what are distinguished as the pronáos and opisthódomus. The columns of the peristyle on the sides stand nearly as far from the walls as they do from each other; and on the fronts, the space intervening between the outer columns of the pórticus and posticum (to use the Roman technical terms by which the front and rear-front porticoes are respectively distinguished), and the inner ones and their antæ, of the pronáos and opisthódomus respectively, is somewhat more than a single intercolumniation. Thus, a kind of gallery was formed on the floor of the peristyle around the body of the temple, and this was raised by three deep steps from a nearly level platform called a perîbolus, in the midst of which the temple stood; this was partly hewn out of the native rock, and partly constructed, and a low wall or parapet girded it on all sides. The temple fronted east and west, the east being the entrance front before which the peribolus extended itself more than 100 feet, while on the west it was not more than 50 feet wide. The extreme length of the temple in front, measured on the face of the lowest step of the regular stylobate, is 49 feet 10·2 inches, and in flank 100 feet 7·7 inches; and on the floor of the peristyle, that is, at the edge of the upper step on which the columns rest, the corresponding dimensions are, 45 feet 2·2 inches, and 96 feet. The columns of the peristyle are a very small fraction less than 3 feet 2·9 inches in diameter, and including their capital they are 17 feet 9·4 inches in height; the entablature, without the crowning moulding of the pediments, is rather more than two diameters of a column in height, and the stylobate is 3 feet 7·7 inches high, or an eighth more than one diameter. The height of the tympana of the pediments to the soffit of the corona was, as nearly as it can be determined, one diameter and four-fifths, and that of the pediments to their ápices, two diameters and two-sixths; making the whole height, from the floor of the peribolus to the summit of the pediments, 35 feet 8 inches, above which the acroterium rose nearly one diameter, or about 3 feet more. Both the tympana were highly enriched with sculptures.

The columns of the Panhellenium are nearly five diameters and a half in height, and they diminish, with an imperceptible éntasis, in the length of the shaft, considerably more than one-fourth,—from 3 feet 2·9 inches to 2 feet 4·6 inches. In the peristyle, and in the pronáos and opisthódomus, the columns have twenty flutes, while those of the inner hypæthral ranges had only sixteen.

The architecture of the Panhellenium indicates an earlier date than that of the Athenian temples of the age of Pericles; but it would hardly lead us so far back as the early part of the sixth century before Christ; though it is not all inconsistent with that period. Some writers have referred the execution of the sculptures which belonged to the Panhellenium to the latter part of the same century; but there is nothing in the reasoning by which they come to that conclusion which will not admit of these sculptures being referred to a remoter period.

The subjoined sketch is a view of the temple in its present state. It is taken on the west front, looking eastward and northward; the walls are thrown down, though their site is not obliterated. The two columns in the foreground are all that remain of the west portico, and the two couples which appear within the external peristyle are those of the opisthódomus and pronáos. In the distance the view embraces the Saronic Gulf and the mountains of Attica.

Ruins of the Temple of Ægina.

This sketch, with the foregoing plan and elevation, were kindly furnished for the 'Penny Cyclopædia,' by Mr. W. Jenkins, jun., architect, who

made the original drawings and actual measurements of the remains on the spot, in October, 1820.

The sculptures which occupied the tympana of the pediments of the Panhellenium were discovered in May, 1811, by a party of English and German travellers, among whom were Messrs. J. Foster, of Liverpool, and C. R. Cockerell, of London, who were pursuing their studies as architects. They were found buried under the ruins of the building and accumulations of rubbish, nearly as they had fallen from their places, especially those of the western front, the whole of which were recovered; but unfortunately not more than half of those of the eastern front could be determined. Thorwaldsen was engaged to repair and restore all the statues which were not so completely broken as to render reparation impossible. Restorations of the two pediments of the Panhellenium, with casts and imitations of the figures on the tympana, have been added to the Athenian and Phigaleian marbles in the British Museum.

ÆGINE'TAN, SCULPTURES. [SCULPTURE.]

ÆGYPT. [EGYPT.]

ÆLFRIC, an eminent Saxon prelate. At an early age he embraced a devotional life, and assumed the habit of the Benedictines in the monastery of Abingdon. He became abbot of St. Alban's, afterwards bishop of Wilton, and finally, in 994, was translated to the archbishopric of Canterbury, over which see he presided with great ability till his death, on the 16th of November, 1005. Ælfric was one of the most learned ecclesiastics of that age, and distinguished himself throughout his life by a very praiseworthy zeal and activity in the diffusion of knowledge.

ÆLIA'NUS, CLAU'DIUS, a Roman citizen and a native of Præneste (Palestrina), probably wrote about the middle part of the third century of the Christian æra. He composed in Greek a work in fourteen books, entitled, 'Various or Miscellaneous History,' which is a collection of extracts made by the author in his extensive reading. An edition of this work was published at Paris in 1805, 8vo. with Heraclides of Pontus and Nicolaus of Damascus, by Coray. There is an English translation, by T. Stanley, London, 1477, 8vo.

Another work of Ælian's, in sixteen books, also written in Greek, 'On the Peculiarities of Animals,' contains many curious facts, which he had collected in his reading. Each of the sixteen books is subdivided into small chapters or sections, like the Miscellaneous History. J. G. Schneider published an edition of the work on animals in 1784, 2 vols. 8vo.; the latest edition of the Greek text is by F. Jacobs, Jena, 1832, 2 vols. 8vo.

ÆLIA'NUS TACTICUS wrote a treatise on Greek Tactics, which he dedicated to the Emperor Hadrian. It was translated into English by Capt. John Bingham, London, 1616, fol. The translator published a second edition of part of his translation in 1631. The Tactics were also translated by Lord Dillon, London, 1814, 4to.

AE'LODON, the generic title applied by H. Von Meyer to the fossil crocodile or gavial of *Mannheim*.

ÆMI'LIUS, PAULLUS LUCIUS, was the son of the consul of the same name, who fell in the battle near Cannæ (B.C. 216), when Lucius was still a boy. His sister Æmilia was married to Publius Cornelius Scipio, the conqueror of Hannibal, who was consul for the second time B. C. 194; and in this year Æmilius, though he had held no public office, was appointed one of three commissioners to conduct a colony to Croton, in the south of Italy. Two years after, at the age of about thirty-six, he was elected a curule ædile. His ædileship was distinguished by many improvements in the city and neighbourhood of Rome. The following year (B. C. 191) he held the office of prætor, and, in that capacity, was governor of the south-western part of the Spanish peninsula. The appointment was renewed the following year, with the title of proconsul. In an engagement however with the Lusitani, 6000 of his men were cut to pieces, and the rest only saved behind the works of the camp. But this disgrace was retrieved in the third year of his government by a signal defeat of the enemy. Soon afterwards he returned to Rome, and found that he had been appointed, in his absence, one of the ten commissioners for regulating affairs in that part of western Asia which had lately been wrested by the two Scipios from Antiochus the Great. He did not attain the consulship until B. C. 182. During this and the following year he commanded an army in Liguria, and completely reduced the Ingauni, who have left their name in the maritime town of Albenga, formerly Albium Ingaunum. On his return to Rome he had a triumph. In the year 171 the last Macedonian war commenced; and though the Romans could scarcely have anticipated a struggle from Perseus, who inherited from his father only the shattered remains of the great Macedonian monarchy, yet three consuls, in three successive years, were more than baffled by his arms. In 168 a second consulship, and with it the command against Perseus, was entrusted to Æmilius. He was now at least sixty years of age, but he was supported by two sons and two sons-in-law, who possessed both vigour and ability. By Papiria, a lady belonging to one of the first families in Rome, he had two sons and three daughters. Of the sons, the elder had been adopted into the house of the Fabii by the celebrated opponent of Hannibal, and, consequently, bore the name of Quintus Fabius Maximus, with the addition of Æmilianus, to mark his original connection with the house of the Æmilii. The younger, only seventeen years of age at this period, had been adopted by his own cousin, the son of Scipio Africanus, and was now called by the same name as his grandfather by adoption, namely, P. Cornelius Scipio, with the addition of Æmilianus, as in his brother's case. By the marriage of his daughters again, Æmilius was father-in-law to Marcus Porcius Cato, son of the censor, and to Ælius Tubero. These four young men accompanied Æmilius to the war in Macedonia, and all contributed in a marked manner to his success. Perseus was finally defeated by the Roman general in a battle at Pydna, in Macedonia. The king made his

escape to the island of Samothrace, where he soon after fell into the hands of the conqueror. The date of the battle of Pydna has been fixed by an eclipse to the 22d of June. After reducing Macedonia to the form of a Roman province, Æmilius proceeded to Epirus. Here, under the order of the senate, he treacherously surprised seventy towns, and delivered up to his army 150,000 of the inhabitants as slaves, and all their property as plunder. On his arrival in Rome, however, he found in this army, with whom he was far from popular, the chief opponents of his claim to a triumph. This honour he at last obtained, and Perseus with his young children was paraded for three successive days through the streets of Rome. But the triumphant general had a severe lesson of affliction in the midst of his honours. Of two sons by a second wife (he had long divorced Papiria) one aged twelve died five days before the triumph, the other, aged fourteen, a few days after; so that he had now no son to hand down his name to posterity. Æmilius lived eight years after his victory over Perseus, and he was censor, B.C. 164. At his death, B.C. 160, his two sons, who had been adopted into other families, Fabius and Scipio, honoured his memory by the exhibition of funeral games; and the Adelphi of Terence, the *last* comedy the poet wrote, was first acted on this occasion. The fact is attested by the inscription still prefixed to the play. Æmilius found in his grateful friend Polybius one willing and able to commemorate, perhaps to exaggerate, his virtues.

(Livy, xxxiv.—xl.; Polybius, xviii.—xxxii.; Plutarch, *Æmilius Paullus.*)

ÆNE'AS, a Trojan prince of the royal blood, son of Anchises and Venus. According to Homer he commanded the Dardanians; and his name occurs frequently in the Iliad, but not in the first rank of heroes. He owes his celebrity to those stories which make him the reputed founder of the Roman empire in Italy, and to his being the hero of Virgil's poem. The chief traditions concerning Æneas and his settlement in Italy are stated in Niebuhr's *History of Rome* (Hare and Thirlwall's translation, vol. i. p. 176).

ÆNEID. [VIRGILIUS.]

ÆNI'GMA (*αἴνιγμα*), a Greek term for what is commonly called a riddle. It is the description of a thing by certain of its qualities selected and disposed with the object of hiding what the thing is, and of occasioning its discovery to come as a surprise. The object of a direct statement is to convey information; that of an ænigma is to exercise the ingenuity. The former, in its simplest and most legitimate form, has only to be *received* by the mind; the latter demands to be *solved*. An ænigma, therefore, may be regarded as one of the complex or ornamented modes of composition, that is to say, one of those which do not merely appeal to the apprehension, but excite and gratify other intellectual faculties. The term ænigma was probably used originally to describe any short composition, such as an apologue, or fable, or other portable sample of wisdom or entertainment. Ænigma is something *dark* and *obscure*, and the corresponding verb (*αἰνίττεσθαι*) always means to speak *ænigmatically*, according to our meaning of the word, or to speak with a certain degree of mystery and obscurity.

ÆO'LIAN HARP, a musical instrument, the sounds of which are drawn from it by a current of air acting on the strings. One may be constructed as follows:—Let a box be made of thin deal, of a length exactly answering to the window in which it is intended to be placed, four or five inches in depth, and five or six in width. Glue on it, at the extremities of the top, two pieces of oak, about half an inch high and a quarter of an inch thick, to serve as bridges for the strings; and withinside, at each end, glue two pieces of beech about an inch square, and of length equal to the width of the box which is to hold the pegs. Into one of these bridges fix as many pegs, such as are used in a pianoforte, though not so large, as there are to be strings; and into the other, fasten as many small brass pins, to which attach one end of the strings. Then string the instrument with small catgut, or *first* fiddle-strings, fixing one end of them, and twisting the other round the opposite peg. These strings, which should not be drawn tight, must be tuned in unison. To procure a proper passage for the wind, a thin board, supported by four pegs, is placed over the strings, at about three inches distance from the sounding-board. The instrument must be exposed to the wind at a window partly open; and to increase the force of the current of air, either the door of the room, or an opposite window, should be opened. When the wind blows, the strings begin to sound in unison: but as the force of the current increases, the sound changes into a pleasing admixture of all the notes of the diatonic scale, ascending and descending, and these often unite in the most delightful harmonic combinations. [ACOUSTICS; HARMONICS.]

ÆO'LIAN ISLANDS, the ancient name of the LIPARI ISLANDS.

ÆO'LIAN MODE, in ancient music, one of the five principal modes of the Greeks. [MODE.]

ÆO'LIANS, one of the branches of the Hellenic (Greek) nation. We trace the name of Æolians to Thessaly, their primitive abode, as far as we know, where they appear to have been closely related to the Phthiotic Achæans of the same country. The Achæi of the Peloponnesus (the Achæi of Homer) were also kinsmen of the Æolians; and the great emigration, commonly called the Æolian, was an emigration of Achæan people. It seems probable that the emigration from the Peloponnesus commenced before the Dorian invasion, or return of the Heraclidæ, as it is called, which caused so great a revolution in the Peninsula; but it cannot be doubted that this event contributed still further to the Achæan or Æolian emigration, under Penthilus the son of Orestes, and others of Agamemnon's descendants. This great revolution in the Peloponnesus, caused by an invasion of the hardy Dorian mountaineers and conquerors from Northern Greece, took place, as the best-informed Greek historians believed, eighty years after the war of Troy, or B.C. 1104. Strabo (ed. Casaub. p. 582) says that the Æolian settlements in Asia were four generations prior to

those called the Ionian. The Æolian colonies on the Asiatic mainland extended at least from Cyzicus along the shores of the Hellespont and the Ægean to the river Caicus, and even the Hermus. They also occupied positions in the interior, as the islands of Lesbos and Ténedos. Homer mentions all these parts as possessed by a different people, which proves that the race of new settlers came after his time. There were twelve cities or states included in the older settlements in that tract of Asia Minor on the Ægean, which was known in Greek geography by the name of Æolis, and formed a part of the subsequent larger division of Mysia. Smyrna, one of them, which early fell into the hands of the Ionians, the neighbours of the Æolians, still exists nearly on the old spot, with the same name.

Besides these twelve states, most of which were near the coast, there were many Æolian towns founded along the Hellespont, the range of the Ida mountains, and on the coast of Thrace.

The name Æolic is often applied to a branch or dialect of the Greek language, which, we have reason to believe, approached nearest to the Doric dialect of the Greek, such as it was spoken in most parts of the Peloponnesus after the Dorian invasion.

ÆOLI'NA, a very small musical instrument, consisting of a number of short elastic metallic springs, fixed in a frame, and acted on by the breath of the performer. The best of the kind comprise three octaves of diatonic sounds, and are also capable of giving the three simple harmonies of the key. [ACCORDION; CONCERTINA.]

ÆOLIPYLE, ÆOLIPILE, an instrument made use of formerly in experimenting, and consisting of a hollow ball, with a small orifice in which a tube might be screwed. It served to boil water in, for the purpose of creating steam.

Æ'OLIS. [ÆOLIANS.]

ÆPI'NUS, FRANCIS MARIA ULRIC THEODORE, a celebrated electrician of the eighteenth century, who was born at Rostock, in Lower Saxony, December 12, 1724, but of whose life few particulars have been preserved. He died at Dorpat, in Livonia, in 1802. The theories of Æpinus on the subjects of electricity and magnetism are curious and important to those who study the history of science.

ÆRA, a point of time from which *subsequent* years are counted, and in some instances *preceding* years, as in the Christian æra. The origin of the word *æra* is very doubtful.

With one or two exceptions, all nations have reckoned time in accordance with the course of the seasons; they have always begun their year at the same season, sometimes perhaps a little earlier, and sometimes later, but invariably keeping near the original commencement.

Here follows a list of the æras which have been or are most in use among the civilized nations of the world, with the year of the Christian æra in which they began:—

1. The year of the world according to the reckoning of Constantinople, which was used in Russia until the beginning of the eighteenth century, and is still employed by the Greek church . . . . . B.C. 5509
2. The year of the world as reckoned at Antioch . . . . . B.C. 5492

[The church of Alexandria originally assumed the year B.C. 5502 as the year of the Creation, but in the year 285 A.D. they discarded ten years, and thus acceded to the computation of Antioch.]

3. The year of the world used by the Jews . . . . . B.C. 3761
4. The Cáliyuga, employed by the learned throughout India, may be called an æra of the Creation, being considered by the Hindoos as the commencement of the present state of the world, or 'Iron Age' . . . . . B.C. 3102
5. The Olympiads; the æra of the victory of Corœbus at the Olympic games, used chiefly by the Greek historians after the age of Alexander . . . . . B.C. 776

[N.B. An Olympiad is a period of four years.]

6. The foundation of Rome: this is generally called the Varronian æra B.C. 753
7. The Catonian æra of the foundation of Rome is . . . . . B.C. 752
8. The æra of Vicramaditya, in common use throughout India . . . B.C. 57
9. The Spanish æra, from the conquest of Spain by Augustus, was employed in Spain, Portugal, Africa, and the south of France. In some provinces this æra was in use until the middle of the fifteenth century B.C. 38
10. The æra of Salivahana, in common use through the southern and western states of India . . . . . A.D. 78
11. The æra of Martyrs, or of Diocletian, so called from the persecution of the Christians in the reign of that emperor, was much used by the early Christians, and is still employed in the churches of the East A.D. 284
12. The Hegira, used by all Mohammedans, dates from the flight of Mohammed to Medina . . . . A.D. 622
13. The Christian æra dates from the birth of Christ; the year in which he was (erroneously) supposed to be born is called 1 B.C., the following year 1 A.D. Many authors call the year of our Lord's birth 0, and consequently make the dates of all preceding events one year less than by the common practice.

AERIAL IMAGES. This name is given to those images which are caused by the convergence of reflected or refracted rays of light, when they appear to be suspended in the air.

If a spectator place himself directly in front of a concave mirror, at a greater distance from it than the centre of its curvature, the pencils of light diverging from points on that part of his person which is turned towards the mirror and is not very far from its axis, will, after reflection,

converge to corresponding points between him and the mirror, and will constitute an inverted image of himself. The rays in each pencil, crossing one another at the image, and falling afterwards in a diverging state on the spectator's eye, will produce a vision of the image, faint however and indistinct: in these circumstances, also, it usually appears to be within or behind the mirror.

But, as the spectator approaches the mirror, the reflected rays which form the image meet at a greater distance from the mirror in its front; the eye, at the same time, being nearer the image, receives pencils which are reflected from parts of the mirror at greater distances from the axis, so that the image appears both greater and more distinct: and if the mirror be at least 18 or 20 inches in diameter, the image of the spectator will be seen hanging in the air, in an inverted position, between himself and the mirror.

If, while the spectator is yet farther from the mirror than the centre of curvature, he advance his hand towards the mirror, the hand of the image will seem to advance to meet it; and at a certain place, which is the centre of the mirror's curvature, the hand and its image will appear to coincide.

If the spectator now advance towards the centre, the image will advance to meet him, but it will become indistinct, and at the centre it will be entirely lost. Proceeding beyond the centre towards the mirror, the reflected pencils will converge to points beyond the centre in the opposite direction, that is, behind the spectator, and the rays of the pencils will enter the eye before they can unite to form the image: then the spectator will perceive the reflection of himself in the mirror in an erect position, and the figure will become more distinct as he approaches nearer to the mirror.

AERIAL PERSPECTIVE. [PERSPECTIVE, AERIAL.]

AERO-DYNAMICS signifies the science which treats of the motion of the air, or of the mechanical effects of air put in motion. In its widest sense, it might be taken to include the effects of the motion of any gaseous substance or vapour; and even the properties of steam might be considered as a part of the science. We shall, however, confine ourselves to the explanation of a few general principles, the applications of which may be found in the articles WIND, WINDMILL, AIR-GUN, SAIL, BELLOWS, RESISTANCE, GUNNERY, &c.

The air is an elastic fluid—that is, any portion of it can be confined in a smaller or expanded into a larger space than it usually occupies. In either case a force or pressure is to be overcome; the air itself resists compression; and the pressure of the superincumbent air is to be overcome before any expansion can take place. This pressure, in the ordinary state of the atmosphere, is estimated at from fourteen to fifteen pounds avoirdupois on every square inch. [AIR.]

As soon as we begin to move, we feel, more or less, the resistance of the air. And, since any body in moving through a fluid, as air, not only displaces a greater number of particles of the fluid in equal times, in proportion as it moves faster, but causes each particle to react against the body more powerfully in proportion as the latter, by moving faster, strikes it with greater force; it follows that the resistance of a fluid at rest against a body moving in it, or the resistance of the fluid in motion against a body at rest, varies with the square of the velocity of the body, or of the air; that is, if the velocity be suddenly made ten times as great, the resistance is made ten times ten, or a hundred times as great. And this is sufficiently near the truth for practical purposes when the velocities are eight or nine hundred feet in a second.

But one circumstance has been neglected. The successive particles of air which the moving body strikes, instead of being moved out of the way completely, are forced upon those in front, so that there is a condensation of air before the moving body; which condensation [ACOUSTICS] is propagated onwards at the rate of about 1125 feet in a second. In the meanwhile, the space through which the body moves, or has moved, is or has been entirely cleared of air; and though the air is forced with great rapidity into the vacant space, yet this is not done instantaneously. Therefore, when a body is in motion, there is an increase of the pressure before the body, and a diminution of that behind it; both which circumstances increase the resistance.

Let a ball move in any direction with a velocity less than 1000 feet per second; then, since the condensation in front is propagated quicker than the ball moves, the air in front may be considered as nearly in its natural state of density, and the motion of the ball will be retarded merely by the want of pressure behind on account of the partial vacuum there. But when the ball moves with a greater velocity (suppose 1700 feet per second) than that of sound (=1125 feet per second), the space immediately behind it may be considered as a complete vacuum, since by experiment it has been found that air rushes into a void space with a velocity of between 1300 and 1400 feet per second; and then the resistance will be much greater than that which would take place if it depended simply on the displacement of the particles of air and the force of their reaction in front. The resistance to an iron ball of twelve pounds weight, moving at the rate of twenty-five feet per second, is equivalent to a pressure of half an ounce avoirdupois; if we increase twenty-five feet per second to 1700 feet per second, or multiply the first sixty-eight times, the square of which is 68×68 or 4624, we might, from the first part of this article, expect a resistance of 4624 half ounces, or 144½ pounds; instead of which, it is found to be 433½ pounds, or about three times the preceding. At a velocity of 1600 feet per second, the resistance was found to be more than twice that given by the theory. Without entering further into details, for which the reader may consult the article GUNNERY, we give some of the conclusions to which Dr. Hutton was led by a long and careful repetition of the experiments of Mr. Robins, his celebrated predecessor in the same track. For the method of conducting these experiments, see WHIRLING MACHINE, BALLISTIC PENDULUM.

1. The resistance is nearly in the same proportion as the surface exposed, but a little greater than this proportion on the larger surface; that is, if we take two bodies of the same figure and material (two iron spheres for example), the surface of the second being twice that of the first, the resistance to the larger sphere is a little more than twice that to the smaller, the velocities being the same in both.

2. The round ends and sharp ends of solids suffer less resistance than the flat ends of the same. Thus, the sharp end or vertex of a cone is less resisted than the flat end or base.

3. Two solids, having the parts presented to, or which push the air, the same, are not equally resisted unless the hinder parts are also the same.

If we suppose both the wind and the body to be in motion, the resistance is variously modified according to the direction of the motions of the two. If the wind and the body move in the same direction, with the same velocity, there is no resistance, for no air is displaced by the body. If the wind move 50 feet per second, and the body 100 feet, the pressure on the body is the same as if it were at rest, with a *contrary* wind of 50 feet per second blowing on it. If the wind and the body move in contrary directions, with velocities of 100 feet, the resistance is that of a wind of 200 feet per second; and so on. If the spectator move with the body unknowingly, the magnitude and direction which he will assign to the wind is that which will produce such a pressure on the body *at rest*, as it really sustains when in motion. [APPARENT MOTION.]

The following well-known table, first given by Mr. Smeaton in the 'Philosophical Transactions' for 1759, and confirmed by the experiments of Dr. Hutton, shows, in pounds avoirdupois, the pressure which different winds will exert upon a square foot of surface exposed directly against them. The first column is a rough representation of the second.

Velocity of Wind. Miles per hour.	Feet per second.	Force on the square foot in pounds avoirdupois.	Character of the wind.
1	1·47	·005	Hardly perceptible.
2	2·93	·020	Just perceptible.
3	4·40	·044	
4	5·87	·079	Gentle pleasant wind.
5	7·33	·123	
10	14·67	·492	Pleasant brisk gale.
15	22·00	1·107	
20	29·34	1·968	Very brisk.
25	36·67	3·075	
30	44·01	4·429	High winds.
35	51·34	6·027	
40	58·68	7·873	Very high.
45	66·01	9·963	
50	73·35	12·300	Storm or tempest.
60	88·02	17·715	Great storm.
80	117·36	31·490	Hurricane.
100	146·70	49·200	Destructive hurricane.

If the direction of the wind be oblique to the plane, the effective velocity may be determined by mechanics [COMPOSITION]; and it will be found to vary with the square of the sine of the plane's inclination to the direction of the wind; that is, V representing the real velocity of the wind, and ϕ the angle of inclination, V sin. ϕ = the effective velocity.

In this theory no allowance is made for the condensation which takes place when the particles of air have struck the plane; and Smeaton has given the empirical formula, V (sin. ϕ)$^{1.842\ \cos.\ \phi}$ for the effective velocity, which is much nearer the truth.

AEROLITES (literally *air-stones*). The observations now going on concerning the August and November meteors, bid fair to add to our present knowledge of the nature and origin of the aerolites or solid masses, which occasionally fall to the earth. The subject will therefore be treated later in the alphabet, under METEORIC STONES.

AERONAUTICS, from two Greek words which signify the science or art of *sailing in air*. [BALLOON.]

AEROSTA'TICS, a compound of two Greek words, which signify literally the science of the standing of bodies in the air. [BALLOON.]

Æ'SCHINES, commonly called the 'Orator,' to distinguish him from another of the same name, was born at Athens about B.C. 389.

The father of Æschines was Atrometus. According to the account of his enemies, he had been a slave, and had obtained his freedom, but his son asserts that he was a true-born Athenian. He was, however, poor enough to be a schoolmaster, with which Demosthenes upbraids his rival as if it were a low and sordid occupation. The imputations which Demosthenes cast on the mother of Æschines were of a still less equivocal character. If we may trust the testimony of Demosthenes, Æschines afterwards became a clerk to some of the inferior magistrates. His next step was somewhat bolder; having a good voice and a fine person, he tried his fortune on the stage. He also served in the Athenian army, and was in the great battle of Mantineia, B.C. 362. Finally he came forward, though not at an early age, as a public man.

Only three orations of Æschines are extant, all of which relate to important events in his public life. He was accused by Demosthenes, one of his fellow ambassadors, of malversation and corruption in the second embassy to King Philip (B.C. 346), the object of which was to obtain Philip's ratification of the treaty of peace; and to this attack he replied in his oration entitled 'On Malversation in his Embassy.' Timarchus, a friend of Demosthenes, had joined in the attack on Æschines; but the orator rid himself of this adversary by successfully prosecuting him for a disreputable course of life. The oration on this subject is called 'Against Timarchus.' The delay caused by the prosecution of Timarchus deferred the prosecution of Æschines till about three years after his return from the second embassy. On this occasion Æschines was acquitted. The third oration is enti-

tled 'Against Ctesiphon,' but is, in fact, an attack on Demosthenes, who replied in his famous oration 'On the Crown.' The pretext on which Æschines attacked Ctesiphon was this:—For some public services which Demosthenes had rendered to the state, it was proposed by Ctesiphon that he should receive a golden crown, but this proposition was considered by Æschines to contain clauses contrary to existing laws. He also denied the claim of Demosthenes on the ground of public services. The cause was not tried till B.C. 330, after the death of Philip, while his son Alexander was in the midst of his Asiatic conquests. Æschines lost his cause, and not having obtained one-fifth part of the votes of the jury, he was compelled to leave Athens, being unable to pay the penalty in that case required by the laws. He retreated to the island of Rhodes, where, it is said, he opened classes for instruction, and became the founder of a school of rhetoric. He is said to have died at Samos, B.C. 314.

The Greek and Roman critics considered the Rhodian school of eloquence, of which Æschines was the reputed founder, to be characterized by a happy mean between the florid Asiatic and the dry and more sententious Athenian style. The style of Æschines is distinguished by great perspicuity and correctness. His narrative powers deserve high praise, nor can we undervalue his powers of abuse, though here he falls below his great rival. We have the strongest testimony to his personal qualifications in the manner in which Demosthenes acknowledges his own inferiority.

The best edition of the text of Æschines is in Bekker's edition of the 'Attic Orators,' Oxford, 1822, 5 vols. 8vo. One of the best editions of Æschines alone is by J. H. Bremi, 1823–4, 2 vols. 8vo. The Abbé Auger translated the orations and letters of Æschines into French. The oration of Æschines against Ctesiphon, with the reply of Demosthenes, was translated into Latin by Cicero. There is an English version by Andrew Portal, and another by Thomas Leland, London, 1770, 8vo.

There are twelve letters extant attributed to Æschines, but probably they are not genuine.

(For a specimen of the style of Æschines, see the *Penny Magazine*, No. 63, p. 117.)

Æ'SCHINES SOCRA'TICUS, the 'Philosopher,' was one of the scholars of Socrates, and as the story goes, the son of a sausage-maker. Three dialogues, still extant under his name, are not considered genuine by most critics. But the language proves them to belong to an age when Greek was still written with great purity. The best edition of these dialogues is by J. F. Fischer, Leipzig, 1786, 8vo. (Fabricius, *Biblioth. Græca*, ii. 691).

AESCHINITE. [TITANIUM.]

Æ'SCHYLUS, the son of Euphorion, and a native of Eleusis in Attica, was born about B.C. 525, and died in Sicily, probably about B.C. 456. Few particulars of his life are recorded; but we know that the soldier-poet fought bravely in the great struggles against the power of Persia, in the battles of Marathon, B.C. 490, and Salamis, B.C. 480. In the later years of his life he visited the court of Hiero, king of Syracuse in Sicily, who being a patron of poets and learned men, had collected around him the most illustrious writers of that day, such as Pindar and Simonides.

Seven tragedies of Æschylus, out of seventy that he wrote, still remain, entitled respectively, 'Prometheus Bound,' 'Seven against Thebes,' 'Persians,' 'Female Suppliants,' 'Agamemnon,' 'Choëphori' (libation-bearers), and 'Eumenides' (or Furies). The three last form a continuous drama, or trilogy, called the 'Oresteia,' which contains (1) the return of Agamemnon from Troy, and his murder by his wife Clytemnestra; (2) the revenge of Orestes, the son of Agamemnon, who kills his mother and the adulterer Ægisthus; and (3) the persecution of Orestes by the Furies, and his release by the sentence of the Court of Areópagus at Athens, and the casting vote of Minerva. With Æschylus originated the practice of the candidates for the dramatic prize at Athens writing three tragedies on some connected subject, to which they added a fourth, called a satyric drama, on some subject treated in a tragi-comic style.

The Greek drama, in its origin, consisted simply of a chorus or company, who celebrated the festival of some deity or hero by appropriate songs and dances. The introduction of a personage to tell some story or history was an innovation, and the connecting this narrator more closely with the chorus was a still further step towards the drama, a Greek word which signifies 'an action,' or, in its more technical sense, 'the representation of a series of events ending in some striking catastrophe.' Æschylus improved on the practice, by introducing a second speaker, and thus making the dialogue, as it really is, the essential part of tragedy. To the chorus, however, Æschylus still allowed a great degree of importance, for in his extant plays the choral songs occupy a large part. He added also to stage effect, by improving the dress of the actors, and giving them suitable masks. [AGATHARCUS.]

The plot of the plays of Æschylus is exceedingly simple; the personages are few, and the events follow one another without any complexity or occasioning any great surprise. His language is always forcible, and the dialogue clear where the Greek text has escaped damage; but, unfortunately, in the frequent copyings to which the works of ancient writers have been subjected, they have often suffered serious injury, and few have sustained more corruption than the plays of Æschylus. In consequence of this the choral parts are often exceedingly obscure; and this obscurity is increased by the wild, unrestrained, and gigantic conceptions of the poet, which seem as if they often strove with the imperfection of language, and endeavoured to find utterance by a superfluity of expression, a heaping together of strong epithets, and the use of long compound words. In spite of these defects, which often make the poetry of Æschylus border on bombast, and afforded a fair subject of ridicule to Aristophanes in his play called the 'Frogs,' we may often admire in this noble writer a real sublimity of conception, a boldness of imagination, and a power

to paint what is grand and terrific in language, that for force, simplicity, and truth, has never been surpassed. The play of the 'Persians' is the only extant Greek tragedy which treats of a subject contemporaneous with the age of the writer. It was written or acted, probably, a few years after the battle of Salamis.

The first edition of Æschylus was printed at Venice in 1518, 8vo., in the press of Aldus, after his death; but the 'Agamemnon' and 'Choëphori' are both incomplete; and what there is of the 'Agamemnon' is tagged to the 'Choëphori,' which has lost its beginning; consequently this edition contains only six plays. One of the best editions of Æschylus is by Wellauer, 2 vols. 8vo., 1823. There is an English poetical version of Æschylus, by Robert Potter. The Germans have several poetical translations of Æschylus, the best of which is by Droysen, Berlin, 1835.

ÆSCULA'PIUS, or more properly, according to the Greek form of his name, ASCLE'PIUS, was the god of medicine in ancient mythology; but several personages of the name are mentioned. The Egyptians also had their Æsculapius (as the Greeks call him), the son of Hermes. But the Greek Æsculapius, the reputed son of Apollo, was the most celebrated, and it is to him that the tales current among the poets and mythologists refer.

According to Pindar, Apollo sent his child to be educated by the Centaur Chiron, who instructed him in medicine. Having reached manhood, he went with Castor and Pollux on the Argonautic expedition. Returning to Greece he practised with eminent success: he not merely cured all diseases; he even recalled the dead to life. Among others, he did this service to Hippólytus, son of Theseus; but Zeus (or Jupiter) struck the bold practitioner dead with lightning. Asclepius was raised to heaven, and made a constellation, under the name of Ophiúchus, the serpent-holder; though some say that Ophiúchus is Hercules.

In Greece, the original seat of Asclepius's worship was in the neighbourhood of his birth-place, at Epidaurus; where a splendid temple was erected to his honour, adorned with a chryselephantine (gold and ivory) statue, half the size of the statue of Olympian Jupiter at Athens. He was represented sitting; one hand holding a staff, the other resting on a serpent's head; a dog couched at his feet. In coins and other ancient remains he is commonly seen with a long beard, holding a staff with a serpent twined about it. Often he is accompanied by a cock; sometimes by an owl. At Epidaurus there was a peculiar breed of yellowish-brown snakes, of large size, harmless, and easily tamed, which frequented the temple, and in the form of which the god was supposed to manifest himself. A few inscriptions have been found in this island relating cures, and the means employed. It was customary to place similar inscriptions in all temples of Asclepius. At Epidaurus there were stones in the sacred precinct, erected in commemoration of cures performed by the god, recording, in the Doric dialect, the names and diseases of the patients, and the method of cure. Six of these remained when Pausanias visited the place in the second century of our æra (ii. 27). The sons of Æsculapius, Machâon and Podalírius, fought before Troy, and are mentioned in Homer: they seem only to have meddled with external injuries.

For some centuries after the Trojan war medical skill seems to have been confined to the temples of Asclepius, in which his descendants, the Asclépiadæ, who formed the priesthood, were alone allowed to practise: until in later times pupils were admitted into the brotherhood, having been solemnly initiated, and sworn to conform to its rules. Probably they made a large profit of the credulity of their patients. Their presumed impostures have been roughly handed by the Athenian comic poet Aristophanes, in his play of the 'Plutus.' The most celebrated temples, besides that at Epidaurus, were those of Rhodes, Cnidos, and Cos, where Hippócrates, a native of the island, is said to have profited by the records preserved in the temple. Croton and Cyréne also possessed schools of medicine. The practice seems to have been intended chiefly to work on the imagination. The god often gave his own prescriptions in dreams and visions, and the patients were to be prepared by religious rites for this divine intercourse. Bathing, abstinence, and tranquillity, assisted by a confident hope of benefit, may often have produced very beneficial effects; and, in a long course of experience, it is more than probable that some valuable knowledge of symptoms and remedies must have been collected.

ÆSCULUS, or the *Horse-Chestnut*, is a genus of plants belonging to the natural order Hippocastáneæ. It consists of trees found in the temperate parts of America and Asia, which are remarkable for the beauty of their flowers and leaves, and for their forming in some sort a type of tropical vegetation in northern latitudes. It must not be confounded with the Æsculus of the Romans, which was a kind of oak. [QUERCUS.] The best known species is the common Horse-Chestnut, *Æsculus Hippocastanum*, a very handsome timber tree, formerly much used for avenues, and still extensively planted wherever round masses of wood or gay flowering trees are required. Its bark and its nuts are also among the more useful products that the hardy trees of this climate afford. It is very singular that the native country of this species should be unknown. The popular name of *horse*-chestnut has arisen from the custom among the Turks of grinding the nuts, and mixing them with the provender given to horses that are broken-winded. Starch is yielded in very considerable quantity by the nuts; but they are not used in the preparation of the starch of commerce. They contain, moreover, so large a quantity of potash as to be a useful substitute for soap; on the latter account, they were formerly employed extensively in the process of bleaching yarn, but are now seldom used. The powder of the dried nut excites sneezing; the bark, which contains a great deal of tannin, is not a bad substitute for Peruvian bark in fevers; and, finally, the starch of the nuts, deprived of its bitterness by maceration in weak ley, has been recommended as excellent nutritious food for horses, goats, oxen, and sheep. The general characters

of the horse-chestnut are too well known to require description. As a forest tree, it is well adapted to light lands, upon which it will thrive, although they may be very sterile; in tenacious clay it is always stunted and unhealthy, as in the Regent's Park, London; in rich alluvial soil it acquires its greatest beauty. The timber is soft and spongy, and of little value. There are no very old specimens in this country, the species having been introduced, it is said, only in 1683.

ÆSHNA. In this recent genus of Libellulidæ, Mr. Strickland ranks a fossil insect from the lias of Warwickshire.

ÆSO'PUS, now commonly called ÆSOP, was probably born about B.C. 619, and he was a contemporary of Solon and Pisistratus. He has long passed as the inventor of those short moral fictions which we call fables. The popular stories of him are derived from a Life, written and prefixed to a collection of Fables, bearing the name of Æsop, by Maximus Planudes, a Constantinople monk, about the middle of the fourteenth century; but this Life is totally unworthy of credit. (Bentley's 'Dissertation on Æsop,' subjoined to that on Phalaris.)

There is little information in the ancient writers relating to Æsop; and even the place of his birth is uncertain. He is said to have been a slave to three successive masters, the last of whom manumitted him. The reputation which he got by his fables is said to have procured him an invitation from King Crœsus to come to Sardis, where he saw Solon.

Æsop is said to have visited Athens during the usurpation of Pisistratus, and to have there composed the fable of Jupiter and the Frogs (Phædrus, i. 2.) Being charged by Crœsus with an embassy to Delphi, and also to distribute a sum of money to every Delphian, a quarrel arose between him and the citizens, in consequence of which he returned the money to his patron, alleging that those for whom it was meant were unworthy of it. The disappointed party got up a charge of sacrilege, upon which they put him to death. A pestilence which ensued was attributed to this crime, and the Delphians made proclamation of their willingness to make compensation for Æsop's death, to any person who should claim it. A grandson of his last master, Iadmon, at length claimed and received it. This singular tale rests on the authority of Herodotus, and as it must have taken place within the memory of many with whom he might have conversed, it may be true. (Herod. ii. 134.)

The time of Æsop's death is uncertain. But if what has been stated is true, he died before the capture of Sardis by Cyrus, or between the years 550 and 544 B.C. The Athenians erected a statue in his honour, which was made by Lysippus.

The fables which pass under the name of Æsop were popular in Athens during the most brilliant period of its literary history. The 'drolleries of Æsop' are mentioned by Aristophanes in terms which imply that they were repeated at convivial parties. Socrates, in prison, turned into verse 'those that he knew;' and Plato, who banishes the fictions of Homer from his ideal republic, speaks with high praise of the tendency of those of Æsop. Demetrius Phalereus made a collection of Æsopean fables, and there were two metrical versions of them, of still later date, one by an anonymous author, the other by Babrius. Phædrus published a collection of fables *in* Latin verse, in the time of Tiberius, the materials of which he professes to have taken from Æsop. There is another collection, written in elegiac verse, in the fourth century, by Avienus.

The Greek prose fables, which pass under the name of Æsop, are not his composition, at least in their present state. Those which are substantially the same with the fables of Phædrus, may, as far as their substance goes, have originated with Æsop. The editions of the fables of Æsop are very numerous. The edition of J. G. Schneider, Breslau, 1812, contains 231 fables attributed to Æsop. The translations and imitations in modern languages have appeared at intervals, from the invention of printing to the present time.

The eastern philosopher and fabulist Lokman has been supposed to be the same person as Æsop. [BABRIUS; LOKMAN.]

ÆSTHE'TICS. *Æsthetik* is the designation given by German writers to a branch of philosophical inquiry, the object of which is a philosophical theory of the beautiful, or, more definitely expressed, a philosophy of poetry and the fine arts, and which has by them been raised to the rank of a separate science. The word *Æsthetik* is derived from the Greek αἰσθητικός (that which concerns feeling or perception), and was first used as a scientific term by Alexander Baumgarten, a disciple of Christian Wolf, who in his *Æsthetica* (Frankfort, 1750–58), considered beauty as a given property of objects, of which we are *becoming sensible*. Winckelmann, without embodying his views in a regular system, developed them chiefly in reviewing and appreciating the remains of ancient sculpture. Kant denied the possibility of a strict science of beauty, inasmuch as beauty, according to him, is not a property of objects, but has its origin in the disposition of our mental faculties. Beauty, according to Schelling, is that manifestation of the principle of art where the infinite appears contained in, or represented by, the finite, or where, in the very object, the difference between the conscious and the unconscious (mind and nature) is annulled.

Most German writers who have published systematic treatises on æsthetics, have, with greater or less independence, followed the principles laid down by Baumgarten, Kant, or Schelling. They commonly divide their systems into a general part, or a discussion of the essence of beauty and art, and a special one, or an inquiry into the peculiar character and predominant principles of the several branches of poetry on the one hand, and the fine arts (chiefly sculpture, architecture, painting, and music) on the other.

ÆSTUARY, from *æstus*, 'a violent motion of sea water,' is a term used in geographical description, in the sense of 'a wide opening at the mouth of a river, in which the tide rises and falls.'

ÆTHER (αἰθήρ), a Greek word, now used to

signify a highly volatile, penetrating, and combustible fluid, several kinds of which may be produced by the action of different acids upon spirit of wine, or alcohol.

Sulphuric æther, obtained by distillation from a heated mixture of alcohol and sulphuric acid, is the chief kind. It is a colourless transparent liquid, of a pleasant smell and a pungent taste, extremely exhilarating, producing a degree of intoxication when its vapour is inhaled by the nostrils. Its specific gravity is from .700 to .750. It evaporates so rapidly, that if we put some into a small glass vessel surrounded with cloth and containing water, and after dipping it two or three times into æther, allow the æther after each immersion to evaporate, the water in the glass freezes by the cold produced. In the open air æther boils at 96°, and in a vacuum at 20° below zero. In the open air it remains unfrozen at 60° below zero. Its vapour is nearly three times as dense as common air. It combines sparingly with water, but with alcohol in all proportions. Both æther, and the vapour which rises from it, are very inflammable. The resins and most of the oils are dissolved by æther; it dissolves a small portion of sulphur and of phosphorus, and the latter solution becomes luminous in a dark room, when poured on the hands or on hot water. The alkalies, potash and soda, are insoluble in æther.

Æther contains the same three elements as alcohol, viz. carbon, oxygen, and hydrogen, but in different proportions; the former being in the proportions 4, 1, 5, and the latter 4, 2, 6. In another point of view an atom of alcohol may be considered as becoming an atom of æther, by being deprived of an atom of water. In a third aspect, æther may be regarded as a compound of water and bi-carburetted hydrogen. Its atomic number is 37, that of alcohol being 46, and of water 9.

Another kind of æther is the phosphoric, which is prepared by the action of phosphoric acid upon alcohol; the phosphoric acid appears to be converted into phosphovinic acid, as the sulphuric is into sulphovinic; the æther produced is precisely similar to sulphuric æther.

Arsenic acid also forms æther when distilled with alcohol. The acid probably undergoes changes similar to the sulphuric and phosphoric acids, and the resulting æther is of the same kind.

Fluoboric acid and alcohol produce æther by their mutual action; the product is of the same nature as the foregoing.

Chloric æther, obtained from alcohol, sulphorinic acid, common salt, and manganese, is colourless, of an agreeable odour, and an acrid taste. Its specific gravity is 1.134: it boils at a lower temperature than water, and is very combustible, burning with a green flame.

Muriatic æther, prepared from muriatic acid and alcohol, is colourless, and has a strong penetrating æthereal smell; its taste is slightly sweet; it is extremely volatile, and consists of muriatic acid and the elements of olefiant gas.

Nitric æther, prepared from nitric acid and alcohol, is of a yellowish colour, and quite neutral when freshly prepared, but it becomes acid by keeping; its smell is peculiar and æthereal, and its taste pungent. It is extremely inflammable.

The acids of vegetable origin, as the acetic, benzoic, citric, gallic, oxalic, and tartaric, are capable of converting alcohol into æther, and they all enter into the composition of the æther which they form.

Silicic æther has recently been obtained by M. Ebelman, from the action of alcohol on chloride of silicium. It is a colourless liquid, possessing a penetrating and æthereal odour, a strong hot taste, and a density of 0.932. Water does not combine with it, but decomposes it very slowly, with a deposit of silica; and it is perfectly neutral to test-papers. There are two varieties of this æther, one containing twice as much silica as the other.

ÆTHERS. Æthers present the most perfect examples of volatile stimulants, being unequalled for rapidity of action when immediate aid must be imparted to the muscular system, especially the involuntary muscles, by augmenting the nervous power, and by quickening its development. Whether they effect this by a direct impression on the nerves, or by previous absorption into the circulation, it is very difficult to determine, since most of them are absorbed so rapidly as almost instantly to mix with the circulating mass. They bear the greatest resemblance to alcoholic stimulants, but are distinguished by more instantaneous effects. These however are more transient, and a more frequent repetition of the dose is therefore required. Fatal results are less likely to follow from large doses of æther than of alcohol, a fact which can only be accounted for by the excess being more speedily thrown out of the system, especially by pulmonary and in some degree by cutaneous exhalations; for the more highly carbonized constitution of æther would lead us to expect a contrary result. This furnishes the proper guide for the treatment of cases of poisoning by them, viz. placing the patient where he may respire as pure air as possible, and in the light, carrying on artificial respiration, if needful, occasionally dashing cold water on the face and temples, and cautiously using venesection or cupping. Transmitting a galvanic current of a moderate force along the eighth pair of nerves is often beneficial. Perseverance in the use of these means for hours is frequently successful. Sulphuric æther is the most powerful of æthereal preparations, and therefore of diffusable stimulants. It is distinguished from the others likewise by having less secondary effects upon the system. Hence it is more employed for its primary effects than for both primary and secondary effects. It is of a peculiar, strong, penetrating, rather agreeable odour; the taste is at first cooling, afterwards hot, leaving a feeling of dryness in the mouth and throat. Its volatility is very great, and though it does not excite redness of the mucous membrance of the stomach in a moderate dose, yet being quickly changed into vapour by the heat of that organ, it causes contraction of its muscular coat, and expulsion of gas, thus acting as a carminative; or it produces most painful disten-

sion, if that viscus be not powerful enough to resist its local action, and is followed by slight cerebral excitement; and even a feeling similar to intoxication may be experienced, which however soon passes off, without leaving any marked depression; though a disposition to sleep, and sometimes tendency to perspiration, are the ultimate consequences. The lungs are the common channel by which it is eliminated, this æther having less influence on the kidneys or skin than the other sorts. If spasm, irregular action, or debility of the organs of circulation, respiration, or digestion, existed previous to its administration, these generally disappear speedily, or are alleviated by its use. Hence it ranks as an antispasmodic of the highest kind. It is therefore resorted to in all cases of imminent danger, from difficulty of breathing, colic, flatulence, and deep depression, such as occurs in cholera asiatica, or the later stages of fever. In relieving paroxysms of asthma it is unrivalled, and may be inhaled along with the vapour of warm water, or by being dropped on a portion of sugar held between the teeth. Like all stimulants, habit diminishes its influence on the system, so that the dose requires to be greatly increased. The vapour of æther has been lately employed for the purpose of producing insensibility, during which the most painful operations in surgery have been performed without being felt by the patient. Teeth have been extracted in this state, both in this country and America; and several capital operations have been performed without pain to the patient.

The other æthers which are or may be used in medicine are the nitric or hyponitrous, called spirits of nitre, chloric æther, acetic æther, and phosphoric æther.

ÆTHIOPIA. [Ethiopia.]

ÆTHOPHY'LLUM, a fossil genus of plants from the keuper. (Brongniart.)

ÆTHU'SA is a genus belonging to the natural order Umbelliferæ, which includes among its species one of the most poisonous plants known in Europe. As many fatal accidents have occurred from the incautious use of its leaves, we shall give a minute description of it.

Æthusa Cynapium is a little annual plant, found commonly in gardens and fields, resembling the common parsley so much that it has acquired the vulgar name of *Fool's Parsley*. From a taper whitish root arises an erect branchy stem, about a foot high, generally stained with purple near the ground. This is covered by finely cut shining leaves of a deep green, much resembling those of Garden Parsley, from which they are known thus: in the *true Parsley*, the leaves are twice pinnated or divided, and the leaflets are broad, and cut into three wedge-shaped toothed lobes; in the *Fool's Parsley*, on the other hand, the leaves are thrice pinnated, and the leaflets are narrow, sharper, and jagged; besides which, the leaves of Fool's Parsley have a disagreeable nauseous smell, instead of the fine aromatic odour of common parsley. When in flower, Æthusa has its principal umbels destitute of involucra, while the partial umbels are furnished with an involucrum, consisting of four or five narrow sharp leaves, hanging down *from one side only* of the common stalk; this last circumstance will distinguish it when in flower, not only from parsley, but from all other British umbelliferous plants.

Many dangerous accidents have occurred from mistaking this plant for parsley. In one case, a person who had eaten it with salad died in little less than an hour; and in another of more recent occurrence, the patient, although the stomach was emptied at a very early period, sank gradually, and died at the end of a few days. The symptoms attendant upon poisoning by Æthusa are, swimming of the head, nausea, cold perspiration, and chilliness at the extremities. To counteract its effects emetics are recommended, and the immediate use of weak vegetable acids, such as lemon-juice, vinegar, or sour wine.

AË'TION (Αετίων), a celebrated Greek painter, and, according to Lucian, one of the best ancient colourists; that writer mentions Aëtion, Apelles, Euphranor, and Polygnotus as the most successful of the ancient Greek painters in the mixing and laying on of colours. Aëtion's exact time is uncertain, although from the manner in which he is mentioned by Lucian, he lived probably in Lucian's own time, or at most very shortly before him. He speaks of him as the most distinguished painter of his time, and describes a very celebrated picture by him of the marriage of Alexander and Roxana, which the painter exhibited at the Olympic games, and which pleased Proxenidas, one of the judges, so much that he gave Aëtion his daughter in marriage.

From the description of Lucian Raphael is said to have made a design, of which there are duplicates or copies, and it was executed in fresco, in the so-called Villa of Raphael, in the garden of the Villa Borghese at Rome; but the composition is puerile, and does not at all merit the praises which Lucian has given to the ancient performance of Aëtion: it has been several times etched or engraved, by J. Caraglio, Volpato, and others.

AË'TIUS (Αέτιος), of Amida in Mesopotamia, a Greek writer on medicine, who probably lived about the end of the fifth and the beginning of the sixth century of our era, as we may infer from the persons whom he mentions in his work. He studied medicine at Alexandria, then the seat of the most celebrated medical school, and afterwards he went to Constantinople, where he appears to have been raised to a high office at the court, since Photius ('Biblioth. Cod.' 221.) calls him κόμης ὀψικίου, that is, *comes obsequii*, a title belonging to the principal officers attending upon the person of the emperor. Aëtius was a Christian, but not free from the superstitions which at that time were introduced into Christianity from Egypt, and which were connected with his profession. His work contains some curious examples of the pretension to cure diseases by means of superstitious ceremonies.

(Fabricius, *Biblioth. Graec.* ix. p. 228, &c.)

ÆTNA, a celebrated volcanic mountain in Sicily; it is situated in the north-eastern part of the island, close to the sea-coast, between the towns of Taormina and Catania. It is the great-

est volcano in southern Europe, and exhibits some of the most striking instances of the revolutions which the crust of the earth has undergone, or is undergoing.

The base of Ætna covers an area nearly 90 miles in circumference, and, according to the late measurement of Captain Smith, the highest point is 10,874 feet above the level of the sea. Owing to this great elevation the higher parts of the mountain have a climate almost as different from the valleys at its foot, as are the polar from the equatorial regions; and from this cause, together with the difference in the nature of the soil, there are three great natural divisions or zones in the mountain—the *fertile*, the *woody*, and the *desert*. The lowest is a beautiful, rich, and populous country, covered with luxuriant fields of corn, vines, and fruit trees; the next is covered by immense forests of chestnuts, oaks, beeches, and pines; and the uppermost is bare and desert. About 1100 feet from the summit there is an irregular plane, estimated to be nine miles in circumference, and from this plane rises the steep terminating cone, at the summit of which is the great crater or opening, continually throwing out sulphureous vapours. The dimensions of the crater have been very variously stated by different travellers, the circumference from two and a half to four miles, and the depth from 600 to 800 feet; but the height of the cone, the diameter of the crater, and its depth, are liable to constant change from the eruptions. Although, taken as a whole, Ætna forms a cone which is in general of a very symmetrical form, when examined in detail it is found to be studded on its flanks, and particularly in the woody region, with numerous minor cones; small when compared with the great mass, but of a magnitude that would make them rank as mountains, if detached. The eastern side is broken by a deep valley, or amphitheatre, four or five miles in diameter, surrounded by vertical precipices, varying from 1000 to 3000 feet in height. This Val di Bove is spoken of by Mr. Lyell as one of the grandest features of Ætna.

The records of history supply no materials from which we can arrive at any knowledge of the gradual growth of the mountain, for the additions to it from the accumulated produce of all the eruptions that have taken place within the period of history, great as they are, become quite insignificant when contrasted with the entire mass of the volcano. But if we compare the time that has elapsed since that comparatively thin covering began to be formed, with that which must have been required to produce, by a similar process, the remaining part, we shall form the most exalted notions of its remote antiquity. We have no ground for supposing that the altitude of Ætna has materially varied within the last 2000 years. Of the eighty most conspicuous lateral cones, not one of the largest has been produced within the period of authentic history.

There are about sixty eruptions recorded in history, from the earliest to the present times. Of these, ten happened before the Christian æra, twelve in the next fifteen hundred years, seventeen during the sixteenth and seventeenth centuries, and somewhat above twenty from that time to the present. Diodorus Siculus speaks of old eruptions of Ætna, said to have taken place long before the Trojan war, and to have occasioned the emigration of the Sicani, the earliest inhabitants of the island, who were afterwards replaced by the Siculi from Italy. An eruption is recorded to have occurred in the time of Pythagoras, who is believed to have died 504 B.C. Another took place 475 B.C., and is alluded to by Æschylus and Pindar. Others are mentioned as having occurred in 425 and 396 B.C.; the latter of which stopped the Carthaginian army in their march from Messina to Syracuse, and obliged them to go round the whole base of the mountain in order to reach Catania. This stream of lava may be seen on the eastern slope of the mountain, near Giarre, extending over a breadth of more than two miles, and having a length of 24 from the summit of the mountain to its final termination in the sea.

Most of the eruptions have presented such similar features, that it will be more interesting and instructive to describe one in detail, than to give mere dates or outlines of all. The following is Ferrara's description of the eruption of 1792:—On the first days of March the mountain emitted thick clouds of smoke, and at night flames were seen to rise to a considerable height. On the 8th it shook violently, and for several days awful roarings were heard, which appeared to proceed from the innermost cavities of Ætna. During April the mountain was tolerably quiet, except that smoke and flames were occasionally seen issuing from its summit. In the beginning of May immense masses of smoke rose in perpendicular columns, and on the 11th lava was seen to flow from the great crater. Meantime shocks of an earthquake were felt at Messina; and on the morning of the 12th the internal roaring was repeated, the black smoke rose in the air in the shape of a gigantic tree, spreading its top to an immense extent around, and in the midst of these dense masses of black smoke were seen numerous globes of white smoke as fleecy as cotton. Towards eleven o'clock A.M. of that day, an explosion, like the discharge of heavy artillery, was heard and felt all around the base of Ætna, followed by a hollow rumbling noise, and the black smoke arose with fresh violence. In the evening the lava flowed down the sides of the mountain in several streams eight or ten miles in length. On the 13th the mountain became more quiet, and remained so till the 23rd, only sending forth a shower of ashes and hot sand, which fell all around its sides. On the 23rd the black smoke re-appeared, and the next day a new mouth opened itself, from which, for several days, blocks of old lava and scoriæ were thrown to a great height, as well as masses of clay, moist and soft. On the 26th another mouth opened in the same direction, and vomited a stream of lava. On the 1st of June a large mouth opened itself half-way up the southern side of the cone of the mountain, and from it a huge torrent of lava issued forth, which ran down the immediate slope beneath, then against one of the

numerous conical hills which rise round Ætna, and was there forced round into a valley 400 feet deep, which had been formed by the waters, and which sloped down to the eastward into the cultivated plain and the vineyards. The lava soon filled up the valley, where it began to harden, but the liquid stream from the heights still pouring in, pressed against it, so that now and then an enormous mass of half-hardened lava would detach itself, and having slidden some distance down the declivity, would break up with a tremendous crash into a thousand fragments, and cover a fresh extent of ground. The sight is described by Ferrara as extremely awful and grand, especially by night. The eruption continued for a whole year, till May, 1793. The stream of lava in its fluid state was often 30 feet high. The lava that flowed first cooled and became condensed at a certain distance, and thus formed a dyke against the current of fresh lava, which swelled up and overflowed its own bed, increasing in height at every fresh overflowing. Thus in many places strata of lava have been formed more than 300 feet high. The stream of lava sweeps the ground on which it flows, carrying along with it the earth, stones, trees, and other substances which it finds in its passage.

For more than half the year the upper part of the mountain is covered with snow; and it forms the great store from which Sicily and Malta are supplied in summer with that necessary of life in a hot climate. After the hot summer of 1828 a search was made for an additional supply of snow; and this elicited the curious fact, that a glacier or field of ice had been prevented, perhaps for ages, from melting, by being covered with a stream of lava. Mr. Lyell supposes that this ice was formed from a mass of drift snow, which was afterwards covered by an enormous thickness of lava, the heat of which was kept from the snow by an intervening layer of volcanic sand.

In Ætna, he who ascends from the sea-shore to the summit passes through all the gradations of climate which he would meet with, were he travelling from the country of the date and the sugar-cane to the arctic circle. His own feelings would not enable him accurately to mark the transitions, but the botanist can trace the lines of separation; for not only are the three zones or regions, before alluded to, defined by the presence or absence of certain great classes of the vegetable kingdom, but each of them is susceptible of subdivisions, determined by the constitutions of certain families of plants, which can only thrive within certain limited ranges of temperature; and thus the mountain is divisible into seven distinct *botanical regions*. Beginning at the base, and proceeding upwards, we find the palm, the banana, the sugar-cane, and the acacia; then cotton, maize, and oranges, next the cork, the oak, the maple, and other trees; then the beech, birch, and fir, and such plants as clover and plantain; higher up occur the soap-wort, the juniper, and groundsel; and highest of all are found only lichens. One of the wonders of Ætna is a chestnut tree, known by the name of the Castagno de' Cento Cavalli, because it is said to be capable of sheltering a hundred horses under its boughs. It appears to consist of five large and two smaller trees, which, from the circumstance of the barks and boughs being all outside, are considered to have been one trunk originally. The largest trunk is thirty-eight feet in circumference, and the circuit of the whole five, measured just above the ground, is one hundred and sixty-three feet. It still bears rich foliage, and much small fruit, though the heart of the trunk is decayed, and a public road leads through it wide enough for two coaches to drive abreast. In the middle cavity a hut is built for the accommodation of those who collect and preserve the chestnuts. From the best evidence this tree is supposed to be some thousands of years old.

The ascent of Ætna is a work of great fatigue, especially in the upper or desert region, both on account of the heat, and of the feet sinking and receding at every step in the loose ashes. But under favourable circumstances of weather the labour is amply rewarded by the magnificence of the vast prospect, varied as it is by the view of Sicily itself, spread out like a map, by the islands with which the surrounding sea is studded, Stromboli pouring forth volumes of smoke, and by the distant shores of Italy.

ÆTO'BATES. Two species of this genus of Rays occur in the London clay of Sheppey. (Agassiz.)

ÆTO'LIA consisted of two chief divisions, one on the coast, extending from the mouth of the Achelous eastwards, along the north shore of the Corinthian gulf as far as its narrow entrance at Antirrhium—the other, called Epiktétos, or the acquired, was the northern and mountainous part. The length of sea-coast, according to the best modern charts, is about 42 miles, measuring in straight lines from one projecting point to another. If the great recesses of the sea about Anatolico and Mesolunghi were included, the distance would be much greater. The south-eastern boundary of Ætolia, which separated the province from that of the Locri O'zolæ, was a mountain range named Chalcis, afterwards, in its north-eastern course, taking the name of Corax. The north and extreme north-eastern boundaries of Ætolia were the small territory of Doris, the branches of Pindus, and part of the western line of Œta.

Ætolia is comprised within the new kingdom of Greece.

The history of the Ætolians, as a nation, is closely connected with that of the Acarnanians. After the death of Alexander the Great, B.C. 323, they came into notice by their contests with the Macedonian princes, who allied themselves with the Acarnanians. In the reign of Philip V. of Macedon (which commenced B.C. 220), the Ætolians, after seeing their chief town, Thermum, plundered by this king, and feeling themselves aggrieved by the loss of all they had seized from the Acarnanians, applied to the consul Valerius Lævinus (B.C. 210). Though this produced no beneficial effects, they formed a second treaty with the Romans (about B.C. 198) after the end of the second Punic war. The immediate object of the

Romans was the conquest of Macedonia, but it proved eventually that this fatal alliance of the Ætolians was the first step that led to the complete subjugation of all Greece by the Romans. A series of sufferings and degradations led the way to the occupation of Ætolia, which was made part of the Roman province of Achæa. Under Roman dominion the few towns of Ætolia almost disappeared; and many of the inhabitants were transplanted to people the city of Nicópolis, which Augustus built opposite Actium, where he had defeated M. Antonius (B.C. 31).

The Ætolians had a kind of democracy during the time of their greatest political importance, from about B.C. 224 to their complete conquest by the Romans, B.C. 168. The Ætolian league at one time comprehended the whole country of Ætolia, part of Acarnania and of South Thessaly, with the Cephallenian isles; and it had, besides, close alliances with other places in the Peloponnesus, and even with towns on the Hellespont, and in Asia Minor. Following, probably, the example of the Achæan league, the different parts of Ætolia formed a federal union, and annually chose a general or president, a master of the horse, a kind of special council called Apoklétoi (the select), and a secretary, in the national congress, held at Thermum about the autumnal equinox. Such scattered notices as we possess about their history and constitutional forms are principally in the Greek writer Polybius (books ii. iv. xvii., &c.).

(Schlosser, *Universalhistorische Uebersicht*, &c., vol. ii. p. 1; Hermann, *Lehrbuch*, &c.)

AFFEERERS. [LEET.]

AFFETTUO'SO, in Music, an Italian word which signifies a tender expressive style; and slowness is invariably implied. In regard to movement, it may be considered as equal in degree to larghetto. [LARGHETTO.]

AFFIDA'VIT, is a statement of facts in writing, on oath. The word is the perfect tense of the barbarous Latin word *affido*, to pledge faith to, and is taken from the old Latin form of a declaration on oath, which commenced thus: '*Affidavit J. S.*,' 'J. S. hath sworn,' &c. Affidavits are necessary in many cases, in order to bring facts under the cognizance of courts of justice: all evidence of facts must be given on oath, or affirmation, either by oral testimony or by affidavit. Where evidence is to be acted upon by juries, it is given as oral testimony; where it is to inform a court or judge, it is often put in the form of an affidavit.

An affidavit is usually made as follows:—if made in a cause, the name of the court in which the cause is pending, and the names of the plaintiff and defendant, are written at the head of the paper. The name, description, and residence of the deponent, or person making the affidavit, are written at length, and the individual who makes the affidavit signs his name at the foot of it. The paper is then shown to him, and he is requested to swear to his name and handwriting, and that the contents of the paper are true. And, lastly, the *jurat* (a term derived from the Latin word *juratum*, 'sworn') expressing the officer before whom, and where, and when, the affidavit is made, signed by the officer. If the affidavit be sworn in open court, that circumstance is mentioned in the *jurat*, and no officer is named.

AFFINITY (from the Latin *affinitas*) means a relationship by marriage. The husband and wife being legally considered as one person, those who are related to the one by blood are related to the other in the same degree by *affinity*. This relationship being the result of a lawful marriage, the persons between whom it exists are said to be related *in law*; the father or brother of a man's wife being called his *father-in-law* or *brother-in-law*. Affinity may be an impediment to marriage, for persons related by affinity are forbidden to marry within the same degrees as persons related by blood. This rule, which excludes from marriage those who are within certain degrees of affinity, is supposed to be founded on the Mosaic law; but the eighteenth chapter of Leviticus, on which the prohibition is founded, is interpreted by some persons as not relating to marriage; and in the case of a deceased wife's sister, the text seems to imply a permission of marriage after the wife's death. The degrees of relationship, both of consanguinity and affinity, within which marriages are prohibited, are contained in Archbishop Parker's 'Table of Kindred and Affinity, wherein whosoever are related are forbidden in Scripture and our laws to marry together.' Parker, of his own authority, ordered this Table to be printed and set up in the churches of his province of Canterbury. The Constitutions and Canons Ecclesiastical, which were made in the reign of James I., A.D. 1603, confirmed Parker's Table, which thus became part of the marriage law so far as that law is administered by the Ecclesiastical Courts. Marriages within the prohibited degrees could formerly only be annulled by the Ecclesiastical Courts, and only during the life of the husband and wife. The 5 & 6 Wm. IV., c. 54, 1835, has declared that all marriages celebrated before the passing of that act between persons within the prohibited degrees of affinity shall not be annulled for that cause by any sentence of the Ecclesiastical Court; but that all marriages which shall hereafter be celebrated between persons within the prohibited degrees of consanguinity or affinity shall be absolutely null and void. This act does not define what are the prohibited degrees, and this part of the enactment must be interpreted by a reference to Parker's Table, and the canons, if the question arises before courts spiritual; and by statute or judicial decisions, if it arises in the civil courts, as it may do in cases of prohibition or of succession. The principal statute is the 25 Hen. VIII., c. 32.

There are certain cases of prohibition, such as the prohibition against a man marrying his deceased wife's sister, which are considered by many persons to rest on no good reasons; but prejudice is greatly opposed to a fair examination of the question. (*Notes on the Prohibition of Marriage in cases of Collateral Affinity*, by Thomas Coates, London, 1842.)

The general rules on this subject are the same in Scotland as in England; but the 5 & 6 Wm. IV., c. 54, does not extend to Scotland.

The distinction between affinity and consanguinity is derived from the Roman law. The kinsfolk (*cognati*) of the husband and wife became respectively the *adfines* of the wife and husband. We have borrowed the words affinity and consanguinity from the Roman law, but we have no term corresponding to *adfines*. The Romans did not reckon degrees of *adfinitas* as they did of consanguinity (*cognatio*); but they had terms to express the various kinds of *adfinitas*, as *socer*, father-in-law; *socrus*, mother-in-law.

AFFINITY. Chemical affinity, chemical attraction, is that power by which bodies combine and form compounds always possessing some properties very different from those of their constituents, and frequently diametrically opposite to them. It differs from the attraction of gravitation in not acting on masses, and only at sensible distances. In this last property it resembles cohesive affinity, but is distinguished from it by occurring only between the particles of dissimilar bodies. Thus, the particles of a mass of sulphur are held together by cohesive affinity, and so also are those of a mass of copper; but if a particle of sulphur be brought into contact with a particle of copper, the two particles being different, and possessing chemical affinity for each other, unite by this power, and form sulphuret of copper.

In all mere *mixtures*, such as alcohol and water, or salt and water, the two may act together in almost any proportions; but in the chemical *compounds* brought about by affinity, the proportions are always definite. Some liquids, such as mercury, water, and oil, have no tendency to unite in any proportion whatever, unless by indirect means.

The simplest cases of chemical affinity are those in which two bodies unite into a binary compound. This is the result of what is termed *single affinity*; and this power may be exerted between two elementary or two compound bodies; and also, though it occurs more rarely, between an elementary and a compound substance. Sulphur and copper, for example, both elementary bodies, readily unite when heated; and sulphuric acid and oxide of copper, both compounds, combine with great readiness.

The effects of chemical combination, thus induced, are very remarkable. For instance, sulphur is yellow and copper is red, but a compound of the two is black; acids give a red tint to vegetable blues, and alkalies give them a green tint; but a salt compounded of an acid and an alkali seldom affects the colour. There are numerous other cases in which the form, colour, smell, taste, density, and other physical qualities, and the chemical properties of fusibility, volatility, solubility, and tendency to combination, in the compound, bear no resemblance to its constituent parts.

The force with which bodies chemically unite arises from mutual and equal affinity: thus, sulphuric acid and potash combine, not merely on account of the affinity of the acid for the alkali, but of the alkali equally for the acid. Each substance, too, has a power of unity with many others; and as this power or tendency is stronger in some instances than in others, there exists what is termed *elective affinity*, or a sort of preference (so to speak) in the combining action. An example will illustrate this:—Nitric acid is capable of combining by *single affinity* with lime or with magnesia; and if some dilute nitric acid, containing 54 parts of real acid, be mixed with 28 parts of lime, the earth will be dissolved in the acid, and a neutral solution of nitrate of lime is obtained. A similar quantity of this acid forms a neutral solution of nitrate of magnesia by combining with 20 parts of that earth. Now, if we mix together 54 parts of nitric acid, 28 of lime, and 20 of magnesia, it might be supposed that the acid—which is of course incapable of dissolving the whole of both of the earths—would dissolve them in the proportions of 14 of lime and 10 of magnesia: it is found, however, that this is not the case, for the whole of the lime is dissolved, and the magnesia entirely left. This arises from the nitric acid having an *elective affinity* for lime rather than for magnesia.

To exhibit the degrees of elective affinity, tables are constructed, in which the substance whose affinities are to be expressed is placed at the head of a column, and is separated from the rest by a horizontal line; beneath this line are arranged the bodies with which it is capable of uniting, in the order of their respective forces of affinity; the substance which it attracts most strongly being placed nearest to it, and that for which it has the least affinity at the bottom of the column. Such a table is useful, but not always accurate.

Another variety is that of *double elective affinity*, in which two compounds mutually decompose each other. Thus, sulphuric acid, carbonic acid, strontia, and potash, are so characterized with respect to mutual affinities, that if sulphate of strontia and carbonate of potash are made to act on each other, both are decomposed, and the components re-unite to form sulphate of potash and carbonate of strontia.

Chemical affinity works much more powerfully when the bodies are in the liquid than the solid state, in most cases; while others, again, require the gaseous state for its full development.

Proportion, *heat*, *electricity*, and *light*, all influence the strength and nature of affinitive combination. If sulphuric acid and alcohol be combined in the ratio of equality, they produce sulphuric æther; but if the proportion of acid be ten times as much as that of alcohol, olefiant gas is produced. With respect to *heat*, the difference is not less striking. If we mix oxygen and hydrogen gases, they will remain in a state of mixture for an indefinite period without combining; but if flame be applied to them they combine with explosion, and water is formed. Water dissolves certain salts, but to a limited extent only when cold; boil it and the solvent power is greatly increased. When mercury is moderately heated in atmospheric air it is converted into peroxide, by combining with the oxygen of the air: heat the compound thus formed more strongly than was required for its production, and the affinity is destroyed; oxygen gas is given out, and the mercury returns to its metallic state. And so on of other bodies.

Electricity possesses remarkable power over che-

mical affinity. Indeed so intimate is the connection between the two, that it is now known that no chemical action takes place without electric action being also manifested. This part of the subject, developed as it has been by Professors Faraday and Daniell, is noticed under ELECTRO-CHEMISTRY. In the mean time the following will serve as an example of the reversal of chemical affinity by electricity. Immerse a piece of copper in a solution of nitrate of silver, the copper is dissolved and the silver precipitated; if we reverse the experiment, and put a piece of silver into a solution of nitrate of copper, no change is effected; if, however, the silver while immersed be touched by a piece of iron, the order of affinity is reversed, the copper is precipitated, and the silver is dissolved.

Light is capable of controlling chemical affinity, both with respect to decomposition and combination. If a mixture of hydrogen and chlorine gases be exposed to the sun's rays, they combine with explosion, and form muriatic acid: this effect does not appear to be produced by the heat which accompanies the light, for a considerably higher temperature is not capable of producing the combination. Or if pale nitric acid be subjected to the action of light, it suffers decomposition to a certain extent, oxygen gas being evolved. Other matters relating to affinity are noticed under ATOMIC THEORY.

AFFIRMATION is the solemn asseveration made by Quakers, Moravians, and Separatists, in cases where an oath is required from others. This indulgence was introduced by the 7 & 8 Wm. III., c. 34, which enacts that the solemn affirmation of Quakers in courts of justice shall have the same effect as an oath taken in the usual form. The provisions of this statute are explained and extended by 8 Geo. I., c. 6, and 22 Geo. II., c. 46, s. 36; but in all these statutes there is a clause which prevents Quakers from giving evidence on affirmation in criminal cases. This exception was removed by 9 Geo. IV., c. 32; and Quakers and Moravians may now give evidence in all cases upon their affirmation. By 3 & 4 Wm. IV., c. 82, the Separatists are allowed to make affirmation instead of taking an oath. The Act 1 & 2 Vict., c. 77, allows the same privilege to persons who have been at any time Quakers, Moravians, or Separatists, and have ceased to be such, but still have conscientious objections to the taking of an oath.

A'FFIX, a term in Grammar, to which the name of *suffix* also is sometimes given. It signifies a syllable attached to the *end* of a word, by which the form and signification of the word are altered. This will be best explained by some examples from our own language. In the words *wealth-y*, *weight-y*, *bulk-y*, and in *god-ly*, *odd-ly*, &c., the syllables *y* and *ly* are the affixes, which qualify the meanings of the words to which they are attached, and fit them for a new and different use; as 'This man loves *wealth*;' 'That is a *wealthy* merchant.' Verbs are in this way made from adjectives, as from the adjectives *sharp*, *quick*, *thick*, we have *sharpen*, *quicken*, *thicken* respectively; and adjectives and adverbs from nouns, as in the examples just given. The *'s*, which marks our possessive case, is an affix, having originally been a distinct syllable, as we see from our old books in such expressions as *Goddes* will; *mannes* duty. Some persons are of opinion that this *'s* has arisen from the possessive pronoun *his*, as in such a phrase *God his will*, *man his duty;* but we are of opinion that this final *'s* is to be referred to the German and Anglo-Saxon genitive termination *es*. When we hear people vulgarly say *hisn*, *hern*, for *his*, *her*, the *n* is the remnant of the syllable *en*, which in these instances marks a kind of pronominal adjective, akin to the genitive or possessive case;—as we may still observe in the German form *dessen*, &c.

In the Latin and Greek, and many other languages, there is the same system of affixes of which we have given examples in the words *weighty*, *bulky;* and in these languages the different cases of nouns, and adjectives, and the different tenses and persons of the verbs, are also formed by affixes. Thus the nominatives *Pindaru-s*, *Homeru-s*, *Liviu-s*, *Antoniu-s*, are the true Roman forms of these names, which in the accusative form *Pindaru-m*, *Homeru-m*, &c., respectively, and so on in the other cases. With the English, it is the common practice to shorten all these words to Pindar, Homer, Livy, Antony; and yet we are not consistent in this practice, for we say *Tibullus*, *Æmilius*, &c., keeping in these instances the genuine form just as it is in the language to which these names belong. The irregularity depends upon the greater or less familiarity of the names. With the French the changes are still more violent.

AFGHANISTAN, or the country of the Afghans, comprehends a large district between India and Persia, lying between 28° and 35° 30′ N. lat., and between 62° and 73° E. long. It extends from north to south about 450 miles, and more from east to west; including an area of more than 211,500 square miles, so that it is somewhat larger than France. To the north of it is Turkistan, to the east the Panjab, to the south Beloochistan, and to the west Persia. Beloochistan is properly a part of Afghanistan, but is at present politically separated from it.

Physical Geography.—Afghanistan is an elevated table-land, the eastern base of which is washed by the Indus river. A comparatively narrow tract of low ground divides the river from the mountain-masses which constitute the eastern edge of the table-land. These masses generally rise with a steep acclivity to an elevation of about 6000 feet above the sea, and on their summit the table-land extends westward to the boundary-line of Persia. But in proceeding in that direction the elevation of the table-land diminishes, so that along the greater part of the western boundary-line of the country it is probably less than 3000 feet above the sea-level. The mountains rise in some parts to 18,000 and 20,000 feet, and may be considered as an offset of the Himalaya mountains of Hindustan. In Afghanistan they form four mountain-regions, which from east to west are known by the names of Hindoo-koosh, Pughman Mountains, Koh-i-Baba, and Paropamisus.

Mountain Region.—Between 35° and 34° N. lat. the Indus runs in a south-south-west direction, and between two very elevated mountain ranges. The western of these two ranges, though it rises in some places as high as 20,000 feet above the sea-level, does not constitute the water-shed of the rivers of this mountain region, which occurs further to the north in a range called the Hindoo-coosh. This Hindoo-coosh meets the Himalayn mountains at a lofty district named Kaferistan, where cultivable valleys and declivities occur between high peaks. Farther west the Hindoo-coosh becomes more lofty and sterile, and includes two mountain passes from 13,000 to 15,000 feet in height; while many of the peaks are always covered with snow.

From the high summit of the Hindoo-coosh the range changes its direction, running nearly due south between 35° and 34° 20′ N. lat., and decreasing somewhat in elevation. This portion consists of two parallel ridges, and includes a pasturage valley more than 10 miles in width. Next occurs the Koh-i-Baba, which is not a mountain region, but a single range. At its eastern extremity it presents an immense mass of rocks, overtopped by three snow-clad peaks: the great mass attains an elevation of about 14,000 feet above the sea, and the peaks rise about 1000 or 1500 feet higher. Patches of snow are found on it in sheltered elevations at 13,500 feet, and towards the summit there are beds of great extent. Farther westward are the mountain regions of the Hazarah and the Eimack; a district of which the general level is as much as 10,000 feet above the sea, and the valleys afford good arable and pasture land.

The valley of the Kabool river lies along the southern base of the eastern portion of the mountain region just described; and the south side of the valley is bounded by a range of mountains, some of whose peaks rise to 16,000 feet, far above the line of perpetual snow. The Kabool flows from west to east into the Indus, falling nearly 10,000 feet in a course of 200 miles. It rises about 37 miles west of the town of Kabool, drains the Mydan valley, and passes through the town of Kabool, where it is an insignificant stream. It flows through Jellalabad and Peshawer towards the Indus, and receives many minor streams in its course; and from Jellalabad downwards it is navigable by rafts floated on inflated skins.

The valley of the Kabool contains three basins, which receive their names from the principal towns, and are called, from west to east, Kabool, Jellalabad, and Peshawer. The basin of Kabool extends about 36 miles from west to east, and from 8 to 16 from north to south. It is divided by two ridges of hills into three plains called Chahar Deh, Koh Daman, and the plain of Logur; all of which contain many fertile and beautiful spots, studded with villages. The dried fruits of the basin of Kabool constitute the principal article of trade; they go to Hindustan. Grapes of a dozen different kinds are grown, but only two species bear exportation. There are six varieties of apricots; of the mulberry as many, besides endless varieties of apples, pears, peaches, walnuts, almonds, quinces, cherries, and plums. Red and white melons are raised in abundance. The wild rhubarb root is used to make preserves; and the vegetables are excellent, but not plentiful. The town of Kabool is 6396 feet above the sea-level, and even the most eastern part of the basin of Kabool is 6000 feet above it; whilst the western rises, in the Mydan valley, to 7747 feet. It has therefore a much colder climate than could be expected from its geographical position, insomuch that although it is warmer in summer than England, in winter it is much colder. In September of 1839, the temperature ranged from 70° to 90° Fahr. in the afternoon; while in the winter of the same year it was often below zero.

Of the other two plains or basins of the Kabool valley, the plain of Jellalabad extends about 40 miles from west to east, and has an average width of about 10 miles. The surface is in general much diversified; some parts being flat and well cultivated, and others high and sterile, but in general well populated, villages and mud castles being numerous. Between the plain of Jellalabad and that of Peshawer is the mountain region of Kyber, rendered famous by the Kyber Pass, through which an English army marched during the recent campaigns: this pass is nearly 20 miles long, and at a great elevation. The plain of Peshawer extends from west to east about 60 miles, with a width varying from 30 to 40 miles. The surface is not level, but presents only long and gentle slopes, in some places broken by ravines. For the most part this plain has a fruitful soil, and a numerous and industrious population, who cultivate great variety of corn and fruit.

The eastern margin of Afghanistan is formed by the Suliman Mountains, which, though not much elevated above Afghanistan itself, are 6000 or 7000 feet above the Indus in the immediate vicinity. The most elevated peak of the range is 11,000 feet above the sea. On the slope of these mountains, at one part, is the Salt-range; where extensive beds of rock-salt are found interstratified with limestone. The range generally presents the usual diversities of a mountain region. In one part the sloping side is formed by terraces, each of which is enclosed by two ridges running south and north. In some places there are three such terraces, in others four. Some of the ridges are overgrown with forest trees; in general they are only covered with shrubs and bushes, but contain pasture ground. Some of the valleys between the ridges are sandy, and can only be used as pasture for camels, goats, and sheep: but the larger number of them have a good clayey soil, intermixed with sand, especially in the neighbourhood of the Indus; their fertility is considerable. Wheat, barley, and several of the grains of Hindustan, as jowary, bajra, &c., are cultivated to a great extent. Considerable quantities of cotton are raised and exported. There is little fruit except dates. Cattle are the chief stock, but sheep are also numerous, both of the heavy-tailed and light-tailed species.

Table-land Region.—The country which is thus bounded on the north and east by mountains is a lofty table-land, of which the eastern part is very

little known to Europeans, but is believed to be inhabited by the Ghiljies and other nomadic tribes.

The central table-land, or that of Ghuznee and Candahar, is bounded on the east by the Sir-i-Koh mountains, and on the west by another range. It is a strip of land varying from 20 to 100 miles in width, and elevated, near Ghuznee, to the extraordinary height of 9000 feet; but much lower towards the south. The surface is much diversified, especially near Ghuznee, where it presents hardly a level tract of any extent, but is in general broken by ravines and watercourses, most of which exhibit numerous ascents and descents of moderate elevation but steep declivities; and at several places many isolated hills occur, which are only separated from each other by ravines. The valleys, however, in this tract have a very good soil, and are well cultivated. As the quantity of rain which falls on this region is small, the lands require irrigation in order to be productive, but the rivers are small and cannot yield a large supply. To obtain this supply the inhabitants have constructed a kind of aqueducts, by which the water of a hill or rising ground is brought out at its foot in a rivulet, to be disposed of at the pleasure of the farmer. Such aqueducts, called *karezees*, are made in the following manner. A well is made at the spot where it is intended the water shall issue; above it in the acclivity is dug another at the distance of five to twenty yards, according to circumstances. The wells are continued at distances generally equal, until the quantity of water collected in them is deemed sufficient, or until the depth of the wells becomes so great that the expense exceeds the advantage. If the acclivity is not very gentle, the highest wells must be very deep, as their bottom must be only slightly elevated above the level of the water in the lower wells. All these wells are then connected by means of aqueducts made under the surface of the ground, through which the water from all of them flows to the foot of the hill. Such contrivances as these are met with in many parts of Asia. As the table-land, taken as a whole, varies from 9000 to 3000 feet in height, the climate presents wide extremes. The weather at Ghuznee, which is near the highest part of the table-land, is very cold. The winter lasts four or five months. The frosts are hard, but little snow falls. Whilst the British army was there (1840) the ice in the pools of water and the ditches of the fort was several feet thick, though the winter was considered mild. From this place to Candahar the temperature increases every stage.

The southern table-land, which descends towards Beloochistan, has a central road leading from the Bolan Pass to the Khojuk Pass, about 5000 feet in height. The Bolan Pass, celebrated in the recent campaigns, is a passage through which lies the great commercial road leading from Candahar to Shikarpoor, and connects Persia with Hindustan. The northern entrance of the pass is more than 5800 feet above the sea-level, and the southern opening only 904 feet. The northern most narrow and steep part of the pass lies between almost perpendicular cliffs, which vary in height from 100 to 600 feet; and the southern in the bed of a torrent, covered with loose gravel. When there is rain in the higher parts of the mountains, the stream at times comes down in an almost perpendicular volume, without warning, and sweeps all before it. In this, as in most other parts of the southern table-land, cultivation is but scanty. The western table-land, which reaches to the confines of Persia, presents most of the features of the others, though perhaps not so boldly developed.

Climate and Productions.—The degree of heat and cold experienced in Afghanistan, as has been already stated, differs greatly in different places, in proportion to the elevation of the different parts of the table-land. The eastern are generally the hottest districts; and a *simoom*, or hot wind, of a distressing kind, is frequently felt. The rainy season, coincident with the south-west monsoon, occurs about July and August, but is not violent. Heavy winter rains fall near the Kabool river; but the country generally is not rainy.

Afghanistan has great mineral wealth. Gold, silver, and copper, are found in various parts; some of the iron found near Peshawer is believed to be nearly equal to that of Sweden, and is largely exported to India. Lead, salt, alum, and saltpetre, are also among the natural products of the country.

The grains cultivated are wheat, barley, peas, beans, maize, rice, and some other grains of Hindustan, as jowary, chuna, musoor, bajra, moth, moong, oord, and murhwa. The most common vegetables are carrots, turnips, radishes, lettuce, cauliflowers, onions, garlic, melons, and cucumbers, with a few others from Hindustan. Madder is extensively grown on the central table-land; and turmeric, assafœtida, and many other useful plants grow extensively. Forests are only found on the Himalaya mountains and the Sufaid-Coh. There are no woods on the table-land, and all the trees found there are planted generally in rows along the water courses and canals, and around the orchards. The mulberry tree is very extensively cultivated; and among the fruits grown are apples, pears, cherries, plums, apricots, peaches, quinces, and pomegranates.

The most important of the domestic animals are the sheep. There are two kinds, both with the broad fat tail, which in some parts of the Eimack mountains is so large that a small cart or frame is put under the tail to support it. These sheep yield two fleeces: the spring or coarser fleece is used for carpets, grain-bags, and other coarse stuffs; the autumn or finer fleece is manufactured into cloth, cloaks, and mummuds or rugs. Goats are nearly as numerous as sheep; and some of them yield a fine and remarkably soft down, which grows at the root of the hair: the hair is long and usually jet black, but the down is of a shade more or less intensive. Horses, mules, and asses are plentiful; camels and cattle less so. The cats of Kabool are distinguished by their long silky hair, and go under the name of Persian cats, though very few of them are found in Persia, and none are exported from that country. These cats are exported in great numbers from Kabool, where

the people encourage the growth of the hair by washing it with soap and combing it. Of wild animals, wolves, leopards, and hyænas are the most common.

Population and Inhabitants.—The population is estimated at 14,000,000, inclusive of Beloochistan, but many persons think that it is greatly overrated. The Afghans, who are the ruling nation, are dispersed over the whole of the table-land; but the mountains are mostly in possession of other tribes, such as the Hazarah and Eimack in the Paropamisus. Among the Afghans are settled Tajiks, Hindus, and Khuzzilbashes, Arabs, with a few families of Armenians, Abyssinians, and Kalmucks.

The Afghans, who compose little more than a third of the dwellers in Afghanistan, are of moderate stature, but remarkably hardy and athletic. Their high cheek bones and prominent noses distinguish them essentially from the Tartars, with whom some persons have confounded them. Their complexions are various; men as fair as Europeans being found in the same places with others dark as Indians. The western tribes are fairer than those of the east. Their hair and beard are mostly black; occasionally brown or red. The usual dress is a sort of frock, reaching below the knee, and loose dark cotton trowsers. The head is covered with a low flat-sided cap of black silk, with a coloured or brocaded top. They wear half-boots, laced in front. The dress of the western tribes resembles that of Persia; and the people of the east imitate their neighbours of India.

The manners of the Afghans are frank and open; they pay little respect to rank, but show great reverence for old age. They are very sociable, and give frequent dinner parties, which are accompanied by singing, dancing, and music. Any game of chance or skill, however childish, that may lend to a dinner, is played with great zest; marbles, prison-bars, hunt-the-slipper, hopping, &c. &c., and the loser treats his opponent. They are also fond of sitting in a circle, conversing, or listening to story-tellers. The people of the east notice the attachment of the Afghans to truth, in which they are much superior to their neighbours of India and Persia, though Europeans would not rank them very high in that respect. They are filled with family pride, and fond of recounting long genealogies, scarcely allowing a man to be a genuine Afghan who cannot prove six descents. They are very jealous of attentions paid to others, and can be more easily wrought upon by kindness than threats.

Hospitality is the great characteristic of Afghans; it is with them a point of honour; and a greater affront cannot be given to an Afghan than by inviting his guest to another dwelling. A man may travel without money from one end of the country to the other, and the bitterest enemy is safe if he claim the protection of hospitality. A person who has a favour to ask of any person goes to his house, and refuses to sit down or partake of food until the boon be granted. This custom is called *nannawatee*, and it brings disgrace on a man to reject a petition under such circumstances.

Another resemblance to the Arabs of the desert, so celebrated for their hospitality, is the practice of robbery by the ruder tribes of Afghans. A traveller passing through certain districts must expect to be plundered, if not under strong protection, while a stranger coming to settle amidst them is perfectly safe. These robberies, however, are never accompanied by murder; and where the government is powerful the traveller is safe.

The good qualities of the Afghans have been summed up by stating that they are faithful, hospitable, brave, frugal, laborious, and prudent. Their bad qualities are revenge, avarice, envy, rapacity, and obstinacy.

Among the western tribes the pastoral character is much retained; many tribes live entirely in black coarse woollen tents, and migrate with their flocks from place to place, as convenience directs. But although the larger extent of ground is occupied by the dwellers in tents, the dwellers in houses are the more numerous body.

Social intercourse with women is less restrained than among other Mohammedans, though in towns the females of the upper ranks live secluded, and never go out without a covering from head to foot.

In the country, women go out unveiled: in the lower ranks they do the work of the house, and in some of the inferior tribes assist the men in the labours of agriculture. Their marriage ceremonies are like those of the Persians.

The language of the Afghans is called Pushtoo; and parts of it are derived from the Persian, the Zend, and the Pehlevi. The sound of the language is rough, but not disagreeable to persons accustomed to oriental tongues. They use the Arabic alphabet, with points over and under certain letters to represent sounds unknown to Arabic. The only original Pushtoo authors are poets; their compositions are chiefly lyrics, of a spirited and bold cast, breathing a strong attachment to liberty. No Pushtoo authors are above a century and a half old; but Persian works are as familiar to the educated Afghans as their own, and the Persian language is that chiefly used in composition.

The education of the Afghans is not neglected; every village has its school, generally kept by a priest, and almost every boy attends it. In some tribes boys are sent to a distant village, where they live in the mosque, and are under the sole guidance of their schoolmaster. The most celebrated univerity is at Peshawer.

Many females are acquainted with Persian literature, and almost all those of a certain rank can read; but writing is not commonly taught there.

The religion of the Afghans is the Mohammedan of the Sunite sect, though accompanied with less bigotry than usual. Hindoos and Christians live peaceably and respected among them: and even Persians, who are of the dissenting Shiite sect, and therefore more abominated by the orthodox than even infidels, hold high official stations among them, upon the simple condition of abstaining from curses on the three first caliphs, the denial of whose right to the commandership over the Faithful forms the chief reason of their dissent.

All the large towns, such as Kabool, Peshawer,

Ghuznee, and Candahar, are inhabited chiefly by Persians and Hindoos. The Afghans are nearly all officers, soldiers, and priests; and scorn to be traders or shopkeepers. The houses of the better classes are large, with numerous courts and halls.

The apartments open on the halls, and are fitted up with paintings and looking-glasses. One room at least has glazed windows, and several have fire-places. The doors are carved, and covered in winter with velvet or brocade. The floors are covered with handsome carpets, and thick felt seats go all round the room, close to the wall, covered with silk or velvet. The houses of the common people are of one story, and usually of a single room, about twenty feet long by twelve broad; they have little ornament and scarcely any furniture. Neither tables nor chairs are used; their place is supplied by coarse woollen carpets and thick felt cushions.

The above details relate to the Afghans properly so called. Among the other inhabitants are the Hazarah and Eimack tribes, who in their features, dwellings, and mode of life show them to belong to the Mongol or Tartar race. The Tajihs or Tadjiks are the agriculturists of the table-land, whose social position pretty much resembles that of the European serfs in the middle ages. Hindoos are largely settled in Afghanistan, where they act as brokers, bankers, and merchants. Kuzzilbashes, a clever but rapacious body of Turcomans, are much employed as secretaries and stewards. The remaining inhabitants of the country, such as Arabs, Armenians, &c. are few in number.

Industry and Commerce.—The chief articles manufactured for export are silk, woollen stuffs, sword-blades, and fire-arms, from Herat and Candahar. Elphinstone enumerates the following as the chief industrial occupations for home produce at Candahar:—Jewellers, gold and silver smiths, booksellers, bookbinders, stationers, makers of kullumdauns (a sort of inkstand and pen-case, of which every man who can write has one), seal engravers, sellers of armour, sellers of shields (these shields are of buffalo's or rhinoceros's hide), gunsmiths, sword-cutlers, polishers of steel, sellers of bows and arrows, sellers of glass ornaments for women, three descriptions of shoemakers, bootmakers, button-makers, silk thread sellers, gold wire and gold thread sellers, saddlers, farriers, painters, fruiterers, cooks, soup-sellers, tobacconists, druggists, perfumers, sellers of sherbet and of fullodeh, confectioners, embroiderers, and people whose business is to sew ornaments on clothes of all descriptions, from jewels to spangles.

As Afghanistan has no navigable rivers, the transport of merchandise is expensive, and the expense is increased by the want of roads, which are not met with in all Western Asia, from the Indus to the Straits of Constantinople. The conveyance of merchandise is therefore effected by beasts of burden. Camels are mostly used in the level countries, and mules or asses in the mountainous districts. Nearly all the land commerce existing between India on one side, and Persia, Turkistan, and China on the other side, must be carried through Afghanistan. Of these lines of communication, the most northern goes by way of Loodiannah, Lahore, Attock, Peshawer, to Kabool on the way to Bokhara. A middle line leads from Lahore to the table-land, where it branches to Ghuznee and Candahar. A southern route reaches Candahar from the mouth of the Indus. From Candahar a route passes westward into Persia.

An active commerce is carried on between Herat and Meshed and other towns in Persia. The exports from Herat consist of shawls and shawl goods, indigo, carpets of Herat, Mooltanee chintz, Indian brocades, muslin and other cotton-cloth, assafœtida, lead (from the mines of the Eimack), cast-iron, saffron, pistachio-nuts, gums, a yellow dye, carraway seeds, and paper. The imports of Herat are chiefly silk, dates, tobacco, lemon-juice, and ivory heel-taps.

Several caravans go annually from Kabool to Bokhara. They export chiefly articles which have been imported from India, especially shawls and shawl-cloth, white cloth of all kinds, India turbans, Mooltanee chintz, indigo, and spices; and they import from Bokhara principally horses, and gold and silver in coins and bars. Some articles brought from Russia are also imported by these caravans, especially cast-iron pots, cutlery and other hardware, needles, looking-glasses, Russia leather, tin, beads, and spectacles. A fine cloth made of camel's wool, some raw cotton, and some lambskins, are also brought from Bokhara and Balkh.

Towns and Government.—There are about six or eight towns in Afghanistan which call for a little notice. The capital of the country is Kabool (written by various authors Cabool, Kabúl, Cabúl, and Caubul). Kabool is situated on the river of the same name, in a large well-watered plain, filled with villages. The town is surrounded on three sides by low hills, on one of which, to the north, is the king's palace. The tomb of the Emperor Baber, on a hill near the city, surrounded by large beds of flowers, commands a noble prospect. The town is not large, but is handsome and compact; and the houses are mostly built of wood, to avoid the consequences of the frequent earthquakes. Beautiful gardens surround the town, which is celebrated for its fine climate, though the proximity of the mountains causes great varieties of temperature.

Peshawer is situated in a plain nearly circular, about 35 miles in diameter, and surrounded by mountains on every side, except a slip of about 20 miles width to the east. The plain is well watered and always green; it is in high cultivation, and produces plums, peaches, apples, pears, pomegranates, and mulberries, with a few dates. The city is about 5 miles round, and contains 100,000 inhabitants. The houses are built of brick, about three stories high; the streets are narrow and slippery, but are paved, and have a gutter in the centre. Part of the town is flooded during the spring rains, which make it then an unwholesome residence.

Ghuznee, or Ghizni, was once the capital of an empire reaching from the Tigris to the Ganges, and was adorned with the most splendid buildings in Asia, but it is now reduced to about 1500 mean

dwellings. Some remains of its ancient grandeur are still to be seen in its neighbourhood; among the rest, the tomb of Sultan Mahmood, the conqueror of India. This structure is about three miles from the city, and is spacious; though not magnificent, and covered with a cupola. The large sandal-wood doors were brought as a trophy from the temple of Somnauth in Guzerat, and were again removed from Ghuznee, by order of Lord Ellenborough, in 1842. On a tombstone of white marble lies the mace of Mahmood, of such a weight that few men can wield it. Mohammedan priests are still maintained, who constantly read the Koran over the grave.

Candahar is on the site of an ancient city, conjectured to have been one of those founded by Alexander the Great. The present city is quite modern, and was founded by Ahmed Shah in 1754. That king made it the capital of his dominions; but on the accession of Timour Shah in 1774 the seat of government was removed to Cabul. Candahar is large and populous, supposed to contain 100,000 inhabitants. Its form is oblong, and its plan perfectly regular; four streets meet in the centre, in a circular place, 50 yards in diameter, surmounted by a dome: this is called the Chaursoo (sharshee), and is a public market-place, surrounded by shops. The four principal streets are 50 yards in width, are lined with shops, and extend to the gates of the city: the smaller streets are narrow, but straight, and all cross at right angles. The town is well watered by canals from the Urghundaub, a tributary of the Helmund; and a small stream runs through almost every street. The tomb of Ahmed Shah, covered by a gilt cupola, stands near the king's palace, and is held as a sacred asylum, the king himself not daring to take a criminal from it. Candahar, unlike any other city, is chiefly inhabited by Afghans, who have conformed externally to the habits of Persians.

Jellalabad, in the valley of the Kabool river, on its southern bank, is built at a nearly equal distance from Kabool and Peshawer. Though the river begins to be navigated by rafts at this place, it does not appear to be a commercial town. The population is stated to be 2000. The houses are low, and the streets narrow. The town is surrounded with mud walls, and has round towers.

Quettah or Quote is not far from the northern entrance of the Bolan Pass, and as the kafilas between Candahar and Shikarpoor pass through it, it has a more considerable trade than one would imagine from the appearance of the place; for it has only 400 small flat-roofed houses of one story each, which are surrounded by a thin mud wall. On the arrival of the caravans many merchants from the adjacent countries assemble here to purchase goods, which they retail among their own countrymen.

Herat is a well fortified town. It contains about 50,000 inhabitants, among whom are about 1000 Hindus and forty families of Jews. It is enclosed by a high and thick wall, surrounded by a wet ditch. There are five gates, defended each by a small outwork; and on the north side is a strong citadel, also surrounded by a wet ditch, which overlooks the town. The interior is divided into quarters by four long bazaars, covered with brick arches, which meet in a small domed quadrangle in the centre of the town. Many of the streets which branch off from the main ones are built over, and form low dark tunnels. The town contains 4000 dwelling-houses, 1200 shops, seventeen caravanserns, and twenty baths, besides many mosques and fine public reservoirs of water. The manufactures of this place are numerous, but we possess very little information respecting the articles which are made, and the extent of this branch of industry. It is stated that there are more than 150 shoemakers' shops in the city, but that they are unable to supply the demand of the province, and that many camel-loads of slippers are brought from Candahar. Many lamb and sheep skins are made up into caps and cloaks. The manufactures sent to other countries consist of different kinds of silk stuffs, some woollen goods, sword-blades, and also the famous carpets of Herat.

Subzawar is situated south of Herat in an extensive valley, and contains about 1000 houses.

There are two towns on the Indus, named Dera Ismael Khan and Dera Ghazé Khan, which are of some importance, as being on the caravan route from India to Candahar.

Although Afghanistan is under kingly power, the influence of the sovereign in the government of the various towns and provinces is little more than nominal. The whole nation is divided into tribes, which continue much unmixed, each under its own peculiar government, with little interference from the royal power. The internal government of the tribes is republican; they are divided into separate clans, and each clan has its chief or khan, chosen from the oldest family. The khans administer justice in most cases, but rarely without the concurrence of a council of the heads of families. The clans are eminently exclusive, and are often at feud with each other: they appear to be little attached to their chiefs, but very strongly to their tribe: they are very jealous of interference; and their republican spirit has preserved the country from degenerating into the ordinary oriental despotism.

In a government so unsettled as that of Afghanistan the political divisions are necessarily variable. When the British embassy was at Peshawer, in 1809, the kingdom was divided into twenty-seven provinces or governments, the eighteen most important of which were superintended by resident hakims, who collected the revenue and commanded the troops. Many of these provinces, as Sind, Mooltan, Cashmere, &c., &c., are now quite independent. The provinces of Jellalabad, Peshawer, Kabool, Ghuznee, and Candahar are the chief. The remaining provinces are mostly composed of countries almost wholly inhabited by pastoral tribes, where there are few towns. There is a governor appointed to each, whose authority is little more than nominal, as he never resides there, but generally leaves the government wholly to the heads of tribes, subject, perhaps, to occasional control. The whole internal government of the country has been greatly

deranged by political events, of which we shall presently speak.

Antiquities.—The antiquities of Afghanistan have lately attracted much attention. In the valley of Bameean, W. of the Pughman mountains, are two colossal statues. Many monuments have lately been discovered, which the natives call *topes* or *tupas*, and which have excited great interest. As far as our present information goes, these monuments occur only in the valley of the Kabool river and its vicinity, especially near Jellalabad.

All the topes, which are in a tolerable state of preservation, consist of two parts, a basement and a perpendicular body resting on it. This construction always terminates above in the form of a cupola, which is sometimes so depressed as to exhibit merely a convexity, but it generally approaches to the form of a cone. These edifices are substantially constructed of layers of large stones, connected with well prepared and beaten earth. They vary greatly in dimensions, some of them having a circumference of 144 feet, and many of only 108 feet. The front, as it appears, is directed to the east, for all of them have flights of steps on that side, and some also on other sides. They are situated on the skirts of hills or elevations, separated from each other by ravines, and in their vicinity there are always many caves, which apparently have been used as dwellings; they are supposed to have been the abodes of priests. Near them there are also always one or more tumuli, but there are tumuli where no topes are found; and, in general, such tumuli abound all over Afghanistan.

Most of the topes contain passages or tunnels, extending from the centre to the circumference, and the centre is occupied by a small apartment. In these apartments, or their recesses, are found caskets or vases of copper or steatite, some of which contain fragments of bones, ashes, and burnt earth, while others contain precious stones, which appear to have been burned. From these and other circumstances it is supposed that the topes were religious monuments connected with the worship of Buddha.

Another kind of antiquities are the coins. Single coins have been found at several places; but they occur in great numbers in the Plain of Beghram, situated in the Koh Daman, where the rivers which drain that valley unite and take their course to the S.E., towards the Kabool river. Mr. Masson employed several years to gather the coins found in this plain; and in 1837 he succeeded in collecting 60,000 copper coins, besides a number of silver and gold coins, a large number of engraved seals, some of them with inscriptions, figures of men and animals, particularly of birds, cylinders, parallelogramic amulets with sculptured sides, rings, and a multitude of other trinkets, generally of brass or copper. When Lieutenant Wood in the following year visited the plain, some children were sent in search of coins, and in a few hours they returned with thirty-five copper pieces. The coins collected by Mr. Masson embrace a period of more than 1250 years: the oldest being coined 256 years before the birth of Christ, and the last about 1000 years after it. These coins are valuable as records of the early history of Afghanistan.

History.—Afghanistan was known to the Greeks under the name of *Ariana*. It formed part of the old Persian empire, with which it passed into the hands of Alexander the Great. After his death it formed, with Bactria, part of the widely extended kingdom of Syria. Shortly before the birth of Christ Afghanistan appears to have been conquered, first by a Scythian race, and then by a Hindoo or Buddhist race, from eastward of the Indus. So far as the newly-discovered coins afford the means of judging, it appears probable that the country was under the dominion of Scythians from the second to the fourth centuries of the Christian era, and of the Persians for the next two or three centuries. When the Arabs rose to power, under the early caliphs, they seized the western parts of Afghanistan; but the hilly country became by degrees occupied by various tribes of Turcomans.

Among the tribes just named were the *Afghans* or *Assakenes*, who have always maintained their descent from Saul, king of Israel, and claim kindred with the tribes of Israel generally: these claims have lately been a fruitful source of inquiry. In the ninth century the Afghans were possessed of the north-eastern part of their present empire, and at the close of the tenth a chief of Khorassan conquered the country, and made Ghuznee his metropolis. For 200 years his family governed the empire; but although the plains were conquered, the Afghans maintained their independence in the mountains. At last, under the conduct of Mohammed of Ghoor, a descendant of their ancient princes, they dethroned the King of Ghuznee, and burned his capital, A.D. 1159. The new dynasty extended the empire from the Tigris to the Ganges; but while making conquests abroad, their own territories became the prey of a stranger; and whil Afghans were seated on the throne of India, Gengis Khan and his descendants ruled in Afghanistan. The Mongol dynasty reigned over the plains, and the Afghans dwelt in the mountains. After the death of Tamerlane, in 1405, the country appears to have been independent for a century. In 1506 the Emperor Baber, a descendant of Tamerlane, conquered Kabool, and made it the seat of empire: the plains of Afghanistan were then divided between India and Persia, but the Afghans still preserved their precarious independence. At the death of Aurungzebe, in 1707, when the Mogul empire lost its power, the Afghan tribe of Ghiljie grew strong, conquered Persia, and founded an empire of vast extent, but little duration. This dynasty was overthrown by Nadir Shah, of Persia, who conquered the Afghans, and annexed their country to his empire. At his death, in 1747, Ahmed Shah, an officer of an Afghan troop in the service of Persia, fought his way back to his own country, and founded the present monarchy. From that time to the death of Timour Shah, in 1793, the empire maintained its splendour, but on that event a civil war broke out between the sons of the deceased king. Four brothers in suc-

cession gained the throne, the Persians invaded Khorassan, and several dependent rulers threw off their allegiance.

It is fruitless to attempt to follow the scenes of anarchy which marked the first quarter of the present century. The sons and grandsons of Timour Shah were perpetually at war with each other, and the real or nominal sovereignty changed hands very rapidly. In 1824 several of the competitors divided the country among them; Dost Mohammed taking the Kabool district, Shah Mahmood that of Herat, and Futeh Khan that of Candahar; the former sovereign, Shah Soojah, having been expelled from his country.

Dost Mohammed, the most powerful of the Afghan leaders, addressed a letter to Lord Auckland, in May, 1836, which was the forerunner of British interference in that quarter; the Afghan desired the friendship of the British, while the governor-general had uneasy thoughts about the intentions of Russia and Persia on our Indian empire. Sir A. Burnes was sent on a mission to Kabool, in 1837, the result of which was that Lord Auckland, suspecting Dost Mohammed, resolved to aid Shah Soojah in expelling him.

Then commenced a busy scene of military operations. In October, 1838, a proclamation of war was issued from Simla against Dost Mohammed. Sir Henry Fane was at that time commander-in-chief of the whole army of India, which was then raised to 203,000 men. Runjeet Singh, the chief of Lahore, had promised aid to the British, but he now hung back. The British and Shah Soojah had together about 25,000 men ready for the expedition, which was to advance towards Kabool by way of Shikarpoor, the Bolan Pass, Quettah, and Candahar. Between Shikarpoor and the Bolan Pass is a broad desert; and Sir Willoughby Cotton, in February, 1839, prepared to cross this desert with an army of about 10,000 men, accompanied by no fewer than 80,000 undisciplined camp-followers. The army reached Candahar in April, having suffered much in their long march of 1000 miles from Firozepoor. The Bombay army, which suffered still more severely, joined the former at Candahar early in May.

After having established Shah Soojah in a precarious kind of sovereignty at Candahar, the British, under Sir John Keane, set off in July for Ghuznee, 230 miles distant. After storming this town, Sir John Keane advanced upon Kabool, which was captured on the 7th of August. Dost Mohammed fled from the country; Hyder Khan, one of his sons, surrendered to Sir A. Burnes; and Akber Khan, another son, was compelled to give up Jellalabad to Colonel Wade.

As Shah Soojah was now reinstated it was considered that the object in view had been attained. Eight thousand Anglo-Indian troops remained at Kabool to secure him on the throne; and Sir W. M'Naghten and Sir A. Burnes resided there as envoys; but the bulk of the army returned to India. Throughout nearly the whole of 1840 and 1841 there were insurrections against the British and Shah Soojah on the part of Afghan chiefs; and although Dost Mohammed surrendered to the English in November, 1840, and went quietly to live in India, yet the country remained in a very unsettled state, requiring the presence of from 10,000 to 16,000 British troops, besides those of Shah Soojah.

In November, 1841, matters arrived at a crisis. The Afghans gradually surrounded the city of Kabool, and great indecision marked the conduct of the envoys. At length Sir A. Burnes and other officers were murdered on November 2; and Sir W. M'Naghten on December 23. After this the British felt so powerless that they agreed to abandon Kabool under very humiliating circumstances, and return towards India. They set out on January 6, 1842, and their retreat was one of the most disastrous and wretched ever known. Out of 26,000 soldiers, camp-followers, women, and children, nearly the whole were either massacred or taken prisoners on this terrible occasion, the Afghans harassing them incessantly.

General Sale held Jellalabad, General Nott maintained himself in Candahar, and Colonel Palmer, with one native regiment and some artillery, retained Ghuznee, which, however, was afterwards taken from him, and Palmer and the remains of his army made prisoners. Akber Khan, on the 18th of Jan. 1842, laid siege to Jellalabad, and though the wretched mud walls, as well as the fortifications thrown up by General Sale, were shattered by a tremendous earthquake, and many other earthquakes occurred, which obliged the soldiers to sleep in their clothes and accoutrements for fear of breaches in the walls and the risk of night attacks, Akber Khan was neither able to take the place, nor prevent Sale's foraging parties from supplying the garrison with the means of subsistence.

In March, Generals Sale, Pollock, and Nott were able mutually to concert plans; but the indecision of the Indian government, and the deficiency of supplies, prevented much being done until August, when General Nott advanced from Candahar to Ghuznee, which he reconquered; and on September 15th Pollock and Nott reconquered Kabool. By October the recaptures were complete, and the Anglo-Indian army returned to India, which they reached just before the end of the year. Shah Soojah was assassinated in the spring of the same year; and his son, Futty Jung, became heir to a very doubtful patrimony.

One of the most interesting features in this short but busy history was the captivity of several British officers, with their wives and daughters, who, either as hostages or prisoners, remained in the power of Akber Khan for a considerable period. In the first place, four hostages were given up in December 1841; and during the retreat in the next following month Lady Sale, Lady M'Naghten, several other ladies, and many officers fell into the hands of Akber Khan. They were all sent to the fort of Budeabad, in the Lughman valley, which they reached Jan. 17, 1842. They were marched back to a fort at Tezeen on the 10th of April. After the defeat of Akber Khan, in August, he hurried off his prisoners to Bameean, where he placed

them under a chief of a fort. This chief was bribed by the prisoners to set them free; and they safely returned to Kabool, at the time when Pollock, Nott, and Sale were in possession of that city, Sept. 21, 1842.

(Elphinstone's *Caubul;* Burnes's *Bokhara;* Conolly's *Overland Journey;* Wood's *Journey to the Oxus;* and *Narratives* by Hough, Vigne, Masson, Lady Sale, &c.)

AFIOUM KARA HISSAR, a city and fortress situated in 38° 45′ N. lat., 30° 56′ E. long., and almost in the centre of Asia Minor; it lies about 200 miles E. from Smyrna. The fortress or castle, which is built of dark-coloured granite (whence the name Kara Hissar, 'Black Castle'), stands on a rock about 200 yards in perpendicular height, and half a mile in circumference. The city is built round the foot of this rock, and is nearly three miles in circuit. It is a great thoroughfare, as it lies on the route leading from Smyrna to Armenia, Persia, and the countries bordering on the Euphrates, and as being the rendezvous of the caravans from Constantinople and Smyrna, which from this place proceed further into the interior. Hence nearly all European manufactures and colonial produce, which are distributed eastward and southward, pass through Afioum. This circumstance renders it a place of considerable importance and activity; and in no other town in this part of Asia Minor are the houses so well built or the shops so well supplied. Afioum is the residence of a pasha: it contains ten mosques, one of which is a noble building, with a portico in front, the whole being covered with domes. It is the seat of a bishop of Armenian Christians, who have two churches, and of whom there are about fifty families resident in the city. The population of the town is stated at 50,000 or 60,000. Its manufactures of wool, tapestry, fire-arms, sabres, and red leather are of some importance; but its chief article of commerce is opium ('afioum'), of which a very large quantity is prepared annually. In the country between this place and Smyrna most of the Turkey carpets are made. Afioum is said to be the Celænæ described by Xenophon, Herodotus, and Arrian, and the Apameia of Strabo. In this place there are ruins of temples and palaces decorated with black marble. (Niebuhr's *Travels;* Pococke's *Travels.*)

AFRICA. The name 'Africa,' which is no doubt of native origin, was probably first introduced into Europe by the Romans, who gave this name to one of their African provinces which comprehended the city of Carthage. Africa was, therefore, properly the name of a limited district, which has since been extended to the whole continent. The real name for this continent, both in the Greek and Roman writers, is *Libya.* Herodotus, the earliest extant Greek author who has transmitted to us any information about Africa, states that Africa is surrounded with water, except at the narrow neck now called the Isthmus of Suez; and one reason for his belief was apparently the story of Africa being circumnavigated by the Phœnicians in the reign of Pharaoh Necho (as he is called in Kings ii. chap. 23), king of Egypt, between B.C. 610 and 594. 'Nechos, king of Egypt (Herod. iv. 42), despatched some Phœnicians in vessels, with instructions to sail round Libya and through the pillars of Hercules (Straits of Gibraltar) into the northern (Mediterranean) sea, and so to return to Egypt. The Phœnicians set out from the Red Sea, and navigated the southern ocean. When the autumn came on, it was their practice to land on whatever part of the coast they happened to be, to sow the ground, and wait for the harvest. After reaping it, they would again put to sea; and thus after two years had elapsed, in the third they passed through the pillars of Hercules and arrived at Egypt. And they said, but for my part I do not believe the assertion, though others may, that in their voyage round Libya they had the sun on their right hand.'

This Phœnician voyage is the only direct statement as to the ancient circumnavigation of Africa that deserves a particular examination, and the best critics are divided in opinion upon it. Major Rennell is in favour of the opinion that the voyage was actually made. In Mannert's 'Geography of the Greeks and Romans,' vol. i., and also Gosselin, 'Géographie des Grecs Analysée,' p. 108, &c., this question is also examined.

Another ancient voyage is better authenticated. Hanno, one of the ruling men of Carthage, or king, as he is termed, sailed from that city through the Straits of Gibraltar, to establish some colonies along the Atlantic coast of the present empire of Marocco. He took with him a large fleet, and 30,000 settlers, whom he left at various places, and then bent his course farther south. He passed a river with crocodiles and river-horses in it, and it has therefore been concluded that he went at least beyond the Senegal; but it is not easy to fix with any precision the extent of the voyage, though it must have been considerably to the south of the Senegal, according to the statement of the voyager. [HANNO.] Polybius, the Greek historian, was sent by P. Scipio Æmilianus to explore the same coast. (Pliny, v. 1.)

When the Greeks were settled in Egypt under Ptolemy, the son of Lagus, one of Alexander's captains (B.C. 323), they became better acquainted with the Red Sea and the course of the Nile; and from this epoch we may date the extension of that trade with India by which the products of the great Asiatic peninsula and of Ceylon were more generally diffused over the western world. This trade existed in great vigour under the Roman emperors, and we have an example of it as late as the sixth century of our æra, in the work of Cosmas. [COSMAS INDICOPLEUSTES.]

One of the most curious documents with respect to ancient navigation on the east coast of Africa, is contained in the 'Periplus of the Erythræan Sea,' which goes under the name of Arrian. This work, which was probably compiled from various log-books and journals, may be assigned to about the time of Pliny the Elder, or perhaps to an earlier period. It has been illustrated, generally in a very satisfactory way, by Dr. Vincent. The 'Periplus' contains much valuable information on the Red Sea, and also a description of the coasts of Arabia, Persia, the western coast of India, and

the eastern coast of Africa. The extreme south point mentioned on the African coast is Rhapta, which Dr. Vincent thinks to be identical with Quiloa. It would seem as if this work was intended for the use of merchants, as the compiler has carefully mentioned the articles of export at each place of importance, and also has informed his readers what kind of commodities would meet with the readiest sale.

From the tables of Ptolemy, the Greek geographer, it appears that the coast of western Africa was known, probably through the navigation of the Carthaginians and the Romans, as far as to 11° N. lat. It is doubtful if the ancient geographers were acquainted with the countries south of the Great Desert. Herodotus (ii. 32) tells a story of some young men of the Nasamones, a tribe near the present Gulf of Sidra, crossing the desert in a westerly direction, and coming to a great river which ran towards the rising sun, and had crocodiles in it, and black men living on its banks. If the narrative is true, the river may be the upper part of the Quorra, now commonly called the Niger. But there are other considerations which must not be omitted in forming an opinion as to the knowledge which the ancients had of central Africa. The powerful state of Carthage, which employed so many elephants in war, and carried on so extensive a commerce, could not be ignorant of the countries south of the Great Desert. The elephant was perhaps not an inhabitant of the Atlas regions, though Pliny ('Nat. Hist.' v. 1) states that it was, and therefore must have been brought to Carthage from central Africa; while the articles of commerce which the interior now furnishes to the coast of Tripoli, were commodities in which the Carthaginians used to deal; such as slaves, ivory, and gold. The Carthaginians had extensive elephant stables and grounds near the city. (Strabo, ed. Casaub. 832.) Seleucus Nicator had a stud of 500 elephants (Strabo, ed. Casaub. 752) at Apameia in Syria, and he had a greater distance to bring them than the Carthaginians, if they got their elephants from central Africa. Pliny ('Nat. Hist.' v. 1) gives an account of Suetonius Paullinus, A.D. 41, crossing the great mountains of the Atlas, and going some distance south; and in Ptolemy we have an account of a Roman officer, Maternus, who set out from the neighbourhood of Tripoli, and went a four months' march in a southern direction. This route must have brought him into the latitude of Timbuctoo, and into the neighbourhood of the Tchad; and if the story is true, the great river, now commonly called the Niger, might have been thus known to the Romans. In examining the tables of Ptolemy, in which the positions of places are laid down according to their latitude and longitude, we find no reason to doubt their general accuracy along the western coast as far as 11° N. lat. He has also given the position of several places in the interior, on a river which he calls Nigir; and the direction thus assigned to the river will come as near the truth as we could expect it to be, even if we knew Ptolemy's tables to be constructed upon real observation, such as was practicable at that time. This question is fully discussed by Col. Leake ('London Geog. Journal,' vol. i.), who is in favour of the opinion that the Joliba of Park, commonly called the Niger, was known to the Romans, and to Ptolemy, who constructed his tables from all the materials accessible to him in the rich commercial city of Alexandria, where he lived.

The Fortunate Islands (now the Canaries) were known to Ptolemy, and he reckons all his eastward distances or longitudes from them, or from some one point in them; for he does not appear to have known any thing accurately as to the relative position of these islands. And as coasting voyages had considerably extended the knowledge of the east coast of Africa, without however showing any termination of the land, Ptolemy concluded that the southern parts of Africa joined the eastern parts of Asia, and thus he converted the Indian Ocean into an inland sea.

The Greek and Roman writers mention the following remarkable African animals with which they were acquainted:—the crocodile and the hippopotamus, both in the Nile and the rivers of western Africa; the giraffe, or camelopard; the elephant; the two-horned rhinoceros; and the ostrich. With the exception of the hippopotamus, all these animals were at different times seen in the Roman capital. The camel is not mentioned as being found in Africa by any ancient writer, we believe, except Herodotus (vii. 69, 86, iii. 9), and it is therefore concluded that it was introduced into this continent by the Arabs.

As the Arabs became acquainted with the country south of the Great Desert as early as the seventh century, and have for many centuries been in the habit of traversing the desert by means of caravans, their authority precedes that of the writers of western Europe, in point of time. The works of three Arab geographers, in respect to Africa, are worthy of attention. One of these is Edrisi, who studied in Cordova, and wrote a work in Sicily (about A.D. 1153). He can only be considered as a geographer, and not a discoverer: he was a native of Ceuta, in Africa, but never travelled in that country, as far as we know. Ibn Batuta, who was a wanderer for thirty years in Asia and Africa, crossed the Sahara, and visited Sego and Timbuctoo. The work of Ibn Batuta, which is very imperfect, has been translated by Professor Lee, of Cambridge. John Leo, an Arab of Granada, commonly known by the name of Leo Africanus, also crossed the desert in the early part of the sixteenth century, and visited the cities on the banks of that great river which has given rise to so many conjectures. Leo wrote his work on Africa at Rome, during the pontificate of Leo X. According to some accounts, it was already written in Arabic when he was taken prisoner by the Christian corsairs and presented to Leo, at whose request he translated it into Italian during his residence at Rome.

Though the descriptions of the Arab geographers are often vague and unsatisfactory, they still show in some directions a more extensive knowledge of Africa than the Greeks and Romans have left on record; and indeed their accounts have been sometimes singularly confirmed by the inquiries of our own age.

Progress of Discovery.—The only portion of the west coast of Africa with which European navigators were acquainted at the beginning of the fifteenth century, was that between the Straits of Gibraltar and Cape Nun, or Nam, or Non, in 28° 40′ N. lat., an extent of not much more than six hundred miles. From this latter point commenced that career of discovery, by the Portuguese, by which the entire coast of Africa has been made known to the modern world.

Prince Henry, son of John I., king of Portugal, was the first to set on foot these exploring expeditions, being urged thereto by the accounts which he received from Moors and others. A ship was despatched about the year 1415, which coasted along to a distance of sixty leagues beyond Cape Nun; but the navigators did not venture beyond a headland which they named Cape Bojador. In 1418, Porto Santo, one of the Madeira Isles, was discovered; and in the following year Madeira itself. In 1432, Cape Bojador was doubled by Gilianez; and two years afterwards the same voyager advanced about thirty leagues beyond this cape, and landed on a coast, where he saw men and flocks: to this coast, from a fish which he found there, he gave the name of the Angra de Ruivos, or Bay of Gurnets. In 1440 Antonio Gonzalez proceeded as far as to Cape Blanco, 20° 47′ N. lat., which, however, was only in 1443 doubled by Nuno Tristan.

In 1444, a number of individuals in the town of Lagos in Portugal formed themselves into a company for the prosecution of African discovery; and this circumstance, coupled with the exertions of Prince Henry, led to a rapid series of discoveries. Various small islands along the coast were discovered; and the coast itself was explored as far as Cape Verde, in 1446; while two rivers, the Senegal and the Rio Grande, were reached in the following year. Prince Henry died in 1463, but the zeal for African discovery, which, in the face of long-continued ridicule and opposition, he had so far fostered, was now become a national passion, and the work of prosecuting what had been so well begun was taken up by the government. Between 1467 and 1484 the discoveries extended, by successive steps, to Sierra Leone, the Grain Coast, the island of Fernando Po, Cape St. Catherine, and the river Congo, or Zaire, the outlet of which is in 6° S. lat. Settlements were made at various places along the coast, and plans were laid for future explorations.

The next was the celebrated voyage of Bartholomew Diaz, who, setting out with three ships, was commanded, if possible, to pursue his course to the south until he should arrive at the extremity of the continent. He attained that object without at first being aware of his success, and went some distance along the eastern side of Africa; but, on his return, he clearly descried the remarkable promontory which has received the various names of the Lion of the Sea, the Head of Africa, the Cape of Tempests, and the Cape of Good Hope.

After Columbus had discovered America in 1493, hopes were entertained that that continent might be reached by an eastern voyage round Africa; and Vasco de Gama was sent by the king of Portugal on such an expedition in the year 1497. He coasted along the east side of Africa till he reached 2° 45′ S. lat., when he boldly struck across the Indian Ocean in an eastward direction. His African researches extended to within 1000 miles of the mouth of the Red Sea. With this exception, the Portuguese had, before 1506, traced the coast line from the Straits of Gibraltar to the southern extremity of the Red Sea, a distance of more than 10,000 miles.

But, in addition to this acquaintance with the coast, the Portuguese, in course of time, also acquired considerable knowledge of the inland country, partly through the establishments which they soon began to form at different points, and partly by means of information that was brought to them from other parts by the natives. One of the main objects kept in view in their early expeditions was the discovery of the residence of the mysterious personage known under the name of the Priest John (Preste João) or Prester John, as it has been Englished, of whom we shall only say here that, whoever he may have really been, he was, from the first intercourse with Abyssinia, taken to be the emperor of that country. Besides other enterprizes, there were, in 1487, two persons sent out from Lisbon to attempt to find out the dominions of Prester John and a route to India by land; and one of these, proceeding by Cairo and Aden, reached Goa, in India, returned thence by Sofala, and afterwards penetrated into Abyssinia, where he was detained for some years. About the same time, a negro prince named Bemoi, from the nation of the Jaloffs or Yaloffs, to the south of the Senegal, arrived at Lisbon to solicit the assistance of the Portuguese to replace him on his throne, from which he had been driven by some rival. This application afforded those to whom it was made a favourable opportunity of introducing themselves into this part of Africa, of which they immediately took advantage. They soon formed various establishments in the space lying between the Senegal and the Gambia, and along the banks of these rivers; and afterwards others of a similar kind along the banks of the Zaire.

The Portuguese discoveries of the sixteenth and seventeenth centuries were the result chiefly of missions sent out to christianize the native Africans. The country actually traversed by the missionaries may be generally described as extending along the coast from Cape Lopo Gonzalves, in 0° 44′ S. lat., to the town of San Felippe de Benguela, in 12° 14′ S. lat., and as far in the interior as to Concabella, on the Zaire, about 400 miles from the mouth of that river, and to Massignan, about 100 miles up the more southerly river called the Coanza. They also established themselves along the east coast of Africa, by the conquest of Quiloa, Mombaza, and Melinda from the Arabs; and from these several points they penetrated to a considerable distance into the interior.

It is a disputed point, whether the French were acquainted with the African coast before the Portuguese; but they appear to have been in the

practice of sending four or five ships annually from Normandy to the river Gambia, soon after the middle of the sixteenth century. This is mentioned by the writer of the account of an English voyage to the Guinea coast, in 1591, printed in the second volume of Hakluyt's Collection. The company to whom these vessels belonged were certainly also possessed of some settlements in the neighbourhood of the Senegal, when, in 1664, they were compelled to sell them to the French West India Company, that year established by royal charter. This association, however, broke up in 1673, when its African establishments fell into the hands of a new company. Partly by conquest, and partly by treaty, the French gained by degrees possession of the coast from Cape Blanco to Sierra Leone, and of a wide belt of interior country. Four or five French African companies in succession held this territory; but they all failed; and about 1720 it was transferred to the crown.

Several journeys into the interior were undertaken by the French residents at the mouth of the Senegal, about the close of the seventeenth and the commencement of the eighteenth century. One of these, by the Sieur Brue, in 1697 and 1698, opened up a wide extent of unexplored country, and led to the establishment of some commercial factories. New information, too, was obtained concerning the river Niger, and the city of Timbuctoo. They heard of a territory named Bambouk; and no sooner was intelligence obtained of the gold dust and mines in which it was said to abound, than the avidity of the new colonists of the Senegal was powerfully awakened, and every effort was employed to penetrate its frontiers; an attempt rendered infinitely difficult and hazardous by the vigilant jealousy of the inhabitants. The country appears, however, to have been visited by the French in 1714, and several times subsequently.

The Dutch, the Danes, and the English, all made attempts to imitate the Portuguese in their African researches; but little was effected until about sixty years ago. It is since the formation of the African Association, in 1788, that the chief efforts have been made in the prosecution of discovery in the interior. The expeditions sent out by the Association and by government, and those undertaken by individual adventurers, have sought Timbuctoo and the Niger from various points. But no considerable progress was made till the first journey in 1795 and 1796 of Park, who, on that occasion, proceeding from the west coast in the direction of the Gambia, discovered much new country in the neighbourhood of Timbuctoo, and found reason to think that the Niger or Joliba (hitherto confounded with the Senegal by the Portuguese) was a wholly distinct river. On his second expedition, which was undertaken at the public expense, in 1805, this adventurous traveller succeeded in sailing a considerable way down the Niger, passing Timbuctoo, and many other cities, near one of which he was murdered.

After a few partial discoveries, by Hornemann and Riley, an expedition was sent out by the government, in 1816, under the command of Captain Tuckey, to the Congo, in the idea that it would be found to be the same with the Joliba or Niger; he ascended that river for about 280 miles, and also examined part of the adjacent country. At the same time Major Peddie, and after his death Captain Campbell, conducted another party from the mouth of the Senegal, through the Foulah territory, as far as Kakundy. In 1817 Mr. Bowdich explored a part of the extensive territories of the Ashantees; and soon afterwards very considerable additions were made to the knowledge formerly possessed both of the geography and the people of interior Africa, by the publication of Mr. Jackson's account of the territories of Timbuctoo and Houssa, from the communications of El Hage Abd Salam Shabeeny, a Mussulman merchant, who had visited these states.

Various discoveries were made by Mollien, Ritchie, Lyon, and Laing, who respectively started for the interior from Senegal, Tripoli, and Sierra Leone. But a more important and successful attempt than any which had been hitherto made to explore the interior of Africa was that of Major Denham and Lieutenant Clapperton, in 1822. These travellers, setting out from Tripoli, along with a caravan of Arab merchants, crossed the desert, and reached the great inland sea or lake called the Tchad. The two travellers, sometimes together, and sometimes separated, visited Bornou, the Fellatah country, and Sackatoo; but they could not trace the Niger (called at Sackatoo the Quorra) to its mouth. In a second expedition Clapperton reached Sackatoo from Guinea, and there died. His servant, Richard Lander, afterwards returned a considerable way towards the south, intending to embark on one of the branches of the Niger, and, if possible, to solve the grand problem of its termination by sailing down the stream. But he was stopped by the natives, and compelled to turn back when he had got as far as Dunrora, which he understood to be due west of Funda, and at no great distance from it. Meanwhile, Major Laing had succeeded in making his way across the desert from Tripoli to Timbuctoo, in August, 1826, and had transmitted some brief notices of that famous city, where he spent some weeks. But he was murdered on his return, in the desert, and none of his papers have yet been recovered. Timbuctoo was also reached from Sierra Leone by Caillé. The journey, however, which solved the problem of the Niger, was that of Richard and John Lander. Leaving Badagry on the 22nd of March, 1830, these two travellers, following nearly the same route which had been taken by Clapperton through the kingdom of Eyeo, reached Boussa on the 17th of June. They afterwards ascended the river as far as Yaouri, from which they returned to Boussa, where they remained for some time, and then embarked on the river, which they hoped would conduct them to the sea. In this expectation they were not disappointed. After various adventures, Richard Lander had at last the happiness, on the evening of the 18th of November, to find himself at the mouth of the greater branch of the river, here called the river Nun, in that gulf or depression known as the Bight of Biafra.

When the news of Lander's success reached England, a commercial company at Liverpool determined to send out an expedition, with a view of opening an intercourse with the centre of Africa. Mr. Lander, Mr. Macgregor Laird, and Captain Allen, were of the party; and two small iron steam vessels were provided, which it was hoped might ascend the Niger in safety. The expedition sailed in 1832; but it turned out most disastrous, being attended with a fearful loss of life. The merchants of Liverpool, however, succeeded in establishing a commerce with the natives by degrees; and in 1840 the government determined to send out an expedition; under an impression that trade and treaties with the African chiefs might lessen the horrors of the slave trade. This was also attended with much loss. Captain Becroft ascended the Niger about the same time, in a vessel sent out by Mr. Jamieson, of Liverpool. Mr. Holroyd, Mr. Oldfield, and Messrs. Moffat and Smith, all increased our store of information concerning those regions, shortly before the period just named. In 1842 Captain Allen explored new regions in western Africa. In 1841 and 1842 Dr. Beke spent a year in Abyssinia, and many researches were made by other travellers in the upper valley of the Nile. In 1843 Major Harris returned from his mission to Shoa, by which much knowledge was gained of that region. In 1844 and 1845 many travellers were exploring the northern half of Africa, in various directions: and the Journal of the Geographical Society now yearly contains the results of such expeditions.

The zeal for discovery in Africa, which has been so strongly felt within the last half century, has also sent out a succession of travellers to explore the southern regions of that vast continent. The principal settlement in this quarter, that of the Cape of Good Hope, was founded by the Dutch about 1650, and remained in their hands till it was finally taken from them by the British in 1806. For more than a hundred years after the establishment of this colony it occupied only the extreme angle of the African continent, or a part of the narrow tract between the sea and the nearest mountains; nor does much information seem to have been obtained with regard to any of the native tribes, except the nearest Hottentots lying beyond that boundary. The first traveller who penetrated any considerable way into the interior was Captain Henri Hop, who was sent out on an expedition of discovery by the Dutch governor in 1761, and traversed a considerable part of the country of the Namaquas. He was followed by Sparrman, Vaillant, Barrow, Trutter, Somerville, Cowan, Donovan, Lichtenstein, and Burchell, who, between 1775 and 1812, traversed much of the country north and east of the Cape. In 1820 and 1823 Burchell and Thompson penetrated far to the north. In 1836 and 1837 Sir J. E. Alexander explored much of the country inhabited by the Boschmans and other tribes north of the Cape of Good Hope. In 1845 the President of the Geographical Society announced exploring expeditions in southern Africa, either commenced, or about to be commenced, by the missionary Krapf, Lieutenant Ruxton, Mr. Ackermann, and M. Maizan, in various directions.

In short, it may be stated, that approaches are now being made towards the centre of Africa, from almost every side of that great continent.

Mr. Brown travelled into Dar-Fûr in 1793; and the Beecheys explored the country east of Tripoli in 1821. Of the district south of the Nile, the chief explorers have been spoken of under ABYSSINIA and ADAL; and those of the Nile valley are noticed under EGYPT.

Coast-Line and Geographical Description.—The extent of the African coast is nearly as follows:—From the south-eastern extremity of the Mediterranean to Cape Spartal, 2468 miles; thence to Cape Bojador, 875; to Cape Formosa, 2985; to the Cape of Good Hope, 3010; to Cape Guardafui, 4550; and from thence to the north extremity of the Red Sea, 2160;—making in all 16,048 miles.

The enormous peninsula of Africa is attached to the Asiatic continent by the Isthmus of Suez; but at two other points, the straits of Bab-el-Mandeb, and those of Gibraltar, it approaches close to the respective continents of Asia and Europe. The equator cuts it into two masses of unequal magnitude; though the extreme southern and northern coasts are, on an average, pretty nearly removed the same distance from the equinoctial line. The latitude of Ras el Krun near Bizerta is 37° 20′ N., and that of Cape das Agulhas (Cape Needles) the most southern part of the continent, is about 34° 50′ S. The distance between these two points is about 5000 miles. The most remarkable projection of the African coast is that which terminates in the bold headland, called by the Portuguese Cape Guardafui, in 11° 50′ N. lat., 51° 22′ E. long.; this is the most eastern point of Africa. Its extreme western point is Cape Verde, 14° 45′ N. lat., 17° 32′ W. long.: the distance between these two capes, in a direct line, is not much less than 5000 miles.

The geographical position and coast line of Africa are characterized by lying for the most part within the tropics, and by the comparatively few deep indentations of the coast. Its northern shores are washed by the Mediterranean, and are the most irregular part of the African coast, presenting the indentations of the Arabian Gulf, the large Gulf of Sidra, and that of Cabes. Only one river of any considerable magnitude, the Nile, flows from the African continent into the Mediterranean. The streams of the Atlas regions that enter the Atlantic, though numerous, are inconsiderable as to the volume of water: the chief are the Mejerdah and the Molooyah. The Atlantic washes the western coast of Africa, which, within the dominions of Marocco, presents a coast generally low, succeeded in the interior by fertile plains of immense extent; and numerous streams flow through this district into the Mediterranean. South of this region, the arid character of the Sahara is found extending even to the shores of the ocean, and hardly disappearing before we arrive at the Senegal. From the Senegal to the Cape of Good Hope, the chief characteristics are

the deep Gulf of Guinea; the rivers Senegal, Gambia, and Grande, north of Sierra Leone; the various mouths of the Niger; and the Congo and Orange rivers, both south of the equator.

The Cape of Good Hope presents a promontory, jutting out towards the south, but still presenting a tolerably straight coast line running 400 miles from west to east. From thence the coast shelves off to the north-east, receiving the Zambezi and other rivers. From the mouth of the Red Sea the coast line forms the western boundary of that sea to Suez, where it terminates.

The great currents on the coast of Africa are too remarkable to be entirely passed over; but as those which are best known are described under ATLANTIC, a brief notice of that round the Cape will be all that is necessary here.

The great bank which lies off the coast of South Africa, and takes its name of Agulhas from the cape of that name, has probably been partly formed by the action of currents. Two main streams, one from the Mozambique channel, the other from the open Indian Ocean, impelled by the S.E. trade-wind, unite nearly opposite to Cape Padron, 26° 20′ E. long. From the meridian of Cape Recif (25° 36′ E. long.) the main stream gradually turns to the west, and strikes on the great bank (in about 35° 30′ S. lat., 23° E. long.), by which its course is changed successively to W., 36° S. lat., to S.W., and finally, in 38° S. lat., it becomes rather east of south. The greatest portion of this current is actually turned round by the east edge of the bank, and finally mingles with a South Atlantic eastern current, and, impelled by it, thus returns into the Indian Ocean by a line nearly parallel to its original course. A part of the stream passes over the deep water at the southern extremity of the bank, and turns towards the N.W., and then uniting opposite the Cape of Good Hope with another part of the main stream (which crosses the northern part of the bank in a western direction between 34° 45′ and 35° 40′ S. lat.) forms a wide stream running to the N.W. as far as 25° S. lat., where it joins the N.W. current formed by the S.E. trade-wind. The existence and course of these currents are indicated not only by their actual motion, but also by their temperature; which is further noticed under CURRENTS, where also the Mediterranean current is described.

Africa seems to be a land of terraces, as indeed all widely extended portions of the earth's surface probably are. It would appear in general to rise from the coast into the interior by successive steps, which are spread out in widely extended plains. These are known to exist in some parts, such as in the Cape Colony, and are indicated in others by a regular series of falls in the beds of the great rivers—the Nile, Quorra, Congo, &c. The existence of elevated table-lands is certain; but the geography of Central Africa is too little known to determine their character and extent.

The mountain system of Africa must, in many cases, be inferred from the course of the great rivers. The high lands of Abyssinia, in which the Takkazie and the Bahr-el-Azrek rise, are in

all probability continued westward, if not at so great an elevation, at least at a very considerable one. But whether these western regions run step by step to a central mountain range, or spread out in wide plateaus or deserts, we do not know. From this remote region the waters of the Bahr-el-Abiad, or true Nile, descend; and from a somewhat lower elevation, probably the Misselad and other streams that find their way into interior lakes. It seems now pretty certain that a range of land stretches across the continent, so as to separate the basin of the Congo from that of the Tchad Lake and its affluents; while the basin of the Quorra is again separated from that of the Tchad by a ridge of small elevation running in a northerly direction.

The expeditions of Denham and Clapperton have made us acquainted with a large internal lake, the Tchad, which, from its extent and position, forms one of the most remarkable features in the physical geography of this continent. Africa, as far as we yet know it, contains comparatively few lakes of any importance, except this one. The interior country watered by the Quorra, by the tributaries to the Tchad, and by other unknown streams that probably exist, may be in general described as a fertile region, well suited to the habitation of man, and apparently not possessing a climate unfavourable to life, either for the natives, or Europeans who know how to take care of themselves.

The great characteristic feature of northern Africa, the Sahara or Great Desert, would form a complete physical barrier between the Mediterranean and the interior but for the long and narrow valley of the Nile; which, in fact, bounded as it is in many parts on the west by a high rocky barrier of limestone, from which the traveller descends to the lower region of the western desert, may be considered as a separate portion of the continent. The broad belt of the desert stretching across the continent seems as if it were only interrupted by the Nile to recommence with the same arid character in the broad wastes of Arabia and the Syrian desert. Arabia, in fact, in its physical conformation, belongs rather to Africa than Asia. The appearance and general character of this remarkable waste are described hereafter. [SAHARA.]

The countries north of the Sahara, from the southern limits of the empire of Marocco nearly as far as the Gulf of Sidra, are sometimes comprehended under the general name of the Atlas regions, so called from the predominant mountain range to which that name is given. The various branches and the geological character of this range is described under the head of ATLAS; and other mountains and plains are described under the names of various African countries.

It has been often remarked that Africa shows few, if any, traces of volcanic action within historical periods, and the occurrence of earthquakes is not established on record, except within the limits of Egypt. But undoubted traces of the former action of subterraneous fire are to be found; for instance, on the west coast on the banks of the Nuñez, and most particularly in the

Canaries, the Cape Verde archipelago, the small islands at the mouth of the Rio Grande, and those in the Bight of Biafra. Jebel Teir, a small island in the Red Sea, is an extinct volcano.

The mineral treasures of this immense continent are of course very imperfectly known. Salt is perhaps one of the most universally diffused, being found from the salt lakes of the Cape colony to the northern coast. It will probably be found on inquiry that the mineral treasures of Africa are nearly as various as those of other parts of the world, though at present less perfectly known, and in many cases only observed at spots widely removed from one another. The mineral wealth of Egypt alone is considerable; and that of the interior west of the Mozambique coast is also abundant. Gold dust, however, is that which has the most excited the cupidity of Europeans; and this mineral is found in the sands of the upper streams of nearly all the great African rivers. Besides gold and salt, the chief mineral products are silver, copper, iron, tin, lead, chalk, sulphur, and a few indications of coal.

Inhabitants.—This extensive continent is characterized by certain varieties of the human species, which it will be useful here to distribute into their proper families as accurately as we can.

The southern regions of Africa are occupied by two nations, the Hottentots and Caffres. The Hottentots, under different names, were once spread over the territory now called Cape Colony, and at the present day may be considered as generally within its limits, though they have been driven from the southern parts by the European colonists. They occupy, also, the basin of the Orange River. The Hottentot presents some varieties both in physical appearance and moral character; but in his lowest state he is one of the most indolent, helpless, and dirtiest of the human family: his form, though spoken of by some travellers as not positively ugly, would appear from the best accounts to be revolting to our ideas. His hair is black, sometimes brownish, very short, and woolly; his profile is hideous, and remarkable for the prominence of the lips, over which the nose is flattened, displaying the open nostrils; the foot is so singularly formed that he can be tracked by its marks. The colour of the skin is dark brownish, or yellowish, but not black. The Caffres differ both from the Hottentots and those whom we call negroes. The nose approaches to an arched form; yet they have thick lips, and hair curly, but less woolly than the negro. Their colour is a blackish grey; and they are generally well-made and of rounded limb.

The most widely extended race in Africa is the negro, which some writers denominate the Ethiopian. Beginning on the west coast with the Senegal river, which is the southern limit of the arid deserts and the commencement of the fertile regions, we find a race essentially different from those of Northern Africa. In the woolly hair, black skin, the profile of the face and forehead, the oblique insertion of the incisive teeth, the form of the pelvis, and the legs, we see the undoubted characteristics of a race peculiar to the African continent. But it is still difficult to say what parts of Africa must be considered as their proper country, as war and the slave-trade have often transplanted the negro from his localities in Africa; and the line of division between them and the Caffre regions is very indistinctly marked; but it is considered pretty certain that the negro is on his native soil in all the regions that extend from the Senegal southwards, along the Gulf of Guinea, and south of the equator as far as the sixteenth degree of latitude.

We know very little of the interior of Africa, south of the points to which Brown, and Denham, and Clapperton advanced; but we may reasonably conjecture these unknown regions to be occupied by black tribes, which indeed is proved to be true, for a considerable distance at least, by the negro slaves whom the traders bring to Dar-Fûr. The cultivable countries which commence south of the Sahara, and are watered by the Joliba and the various tributaries of Lake Tchad, are the region of the negroes, and known among the Arabs by the general name of Sudan, or the country of the blacks. But we cannot say how far eastward the proper negro extends. [SOODAN.]

The desert of the Sahara, and the southern limits that border on Sudan, swarm with innumerable tribes, of whom the greatest number are included under the general name of Moors. They are a mixed race, and live a wandering life; they are not Arabs, but they have adopted the religion of Mohammed.

The mountain regions of the Atlas, which by their position and character hardly belong to the continent of Africa, as well as the entire shores of the Mediterranean from the Straits of Gibraltar to the Cyrenaic regions, have been subject to the invasion of conquerors ever since the earliest periods of history. The Phœnicians, Greeks, and Romans, Vandals and Goths, and Arabs from Asia, have at different periods possessed portions of these regions, and mixed their blood with that of previous races. The Arab invasion has produced the most permanent effects, and that nation now occupies the most fertile parts of the Atlas region and the towns on the coast, and are generally known to us by the incorrect appellation of Moors; the subsequent conquests of the Turks (also an Asiatic race) have done little more than establish a despotic power on a few isolated spots, under a military chief. But it seems not unlikely that, after all these violent revolutions, the Berbers and Shelluhs of the Atlas mountains are the descendants of the primitive inhabitants, and that they retain their original language in all its substantial parts. [BERBERS.]

The races of ABYSSINIA are described in that article; and the Copts of Egypt, the Moors of Marocco, and other tribes, are described in connection with the countries to which they belong.

The Mohammedan religion has spread over at least one-third of the continent; and some of its precepts and practices seem well adapted to win the favour of the indolent and pleasure-loving negro. The only African countries where Christianity is now established, excepting the few European settlements, are Egypt and Abyssinia. In Egypt it is confined to the Copts, and in Abyssi-

nia both its doctrines and precepts are as ill understood as they are obeyed. The natives of the southern half of Africa are for the most part heathens. A small number of Jews have settled in Egypt, Abyssinia, and Marocco.

The Arabic is the only character that is now used in Africa by those who wish to read and write, except those employed by the people of Tigre and Amhara. Its use is, however, limited to very few in Sudan, where it is only great doctors who can read and write.

Botany.—The nature of African vegetation will be best understood by tracing geographically the changes it undergoes between a state but little different from that of the south of Europe, and the singular Flora of the Cape of Good Hope. To the traveller who passes from the south of Europe to Tangier, the appearance of the African coast presents nothing remarkably different from what he has left in Europe; and along the whole of the most northern shores so great a similarity continues to be preserved, that if it were not for a few striking objects he might fancy himself still in Spain or in France. On this northern coast the date palm is first found; but its fruit does not arrive at perfection, and it is chiefly valued as an object of ornament to gardens and houses.

The principal objects of cultivation in the Barbary States are a kind of wheat (*Triticum durum*), the stems of which are solid, and the grain horny rather than farinaceous; barley, which the Moors give their horses instead of oats, maize, durra (*Holcus sorghum*), rice, tobacco, olives, oranges, and figs of the most delicious quality; pomegranates, grapes, and jujubes, together with sweet melons and water melons.

As soon as the chain of the Atlas is passed the scene begins to change; the excessive dryness of the climate on the northern borders of the Great Desert is such that few trees except the date can maintain an existence.

Egypt exhibits a scene intermediate, as it were, between the first and the last of these descriptions; but also presenting more the appearance of a tropical country. European plants begin to disappear. In the districts watered by the Nile we find all the richness of vegetation of the spring months of Barbary; abundance of rice, barley, and wheat; rich fields of sugar-canes; olives, figs, vines, and plantains that have been introduced; while in the hotter or drier, or more southern districts, the date is the chief object of the scenery. In the richer parts of the country we find the acacias which produce gum arabic, large tamarisk trees, called atlé, great quantities of the senna plant (*Cassia obtusifolia* and other species), intermixed with various herbs belonging to tropical genera, all of which are either unknown or very rare in the more northern parts of Africa. Cotton, coffee, indigo, and tobacco are cultivated with the greatest success. At Thebes first begins to appear a third race of palms different from the date and the palmetto, namely, the forky-branched doom palm (*Crucifera Thebaica*) of Upper Egypt.

The deserts that occupy a large part of this continent, like inland oceans of sand, are scarcely

inhabited by any plants except of the most stunted character; one of the most remarkable is a grass called kasheia (*Pennisetum dichotomum*), which wholly covers immense districts, and is said to cause intolerable annoyance to the traveller by its prickly involucrum; another is the agoul (*Alhagi maurosum*), which furnishes a grateful food for the camel.

In the equinoctial parts of Africa all trees of European vegetation, and even the date tree itself, disappear. Where moisture exists in sufficient abundance to favour vegetation, the Flora partakes in a certain degree, particularly on the east side, of the plants of India, but is to a much greater extent composed of species peculiar to itself. The landscape is characterized by masses of the unwieldy baobab (*Adansonia*), the fruit of which affords the natives a grateful drink, huge cotton trees (*Bombax pentandrum*), the trunks of which project at the base into great buttresses, shrubs of richest verdure, large gramineous plants with branching stems, impenetrable thickets extending into the water, with thick groups of oil palms (*Elais Guineensis*), sago palms (*Sagus raphia*), and others of the same majestic tribe. In some places the woods abound in pine-apples, which, although not natives of the continent, have established themselves as completely as in their native stations in tropical America; the plains are often covered with immense quantities of the papyrus plant, to the exclusion of all others; and in the regions near the line a new feature is introduced by the chandelier tree (*Pandanus candelabrum*), which rises singly in the plains, and divides its grotesque branches into repeated forks, the extremities of which are crowned with long, rigid, channelled leaves, like those of the pine-apple.

With the general nature of the vegetation change also the species that are cultivated for the food of man. In the tropical regions of Africa we meet with the cassava, the yam, the pigeon pea, and the ground-nut; the papaw, the tamarind, and the nitta or doura tree; the Senegal custard apple, the grey plum, the Safu, and the musanga, the seeds of which are as agreeable as hazel-nuts, and many others less common.

As we approach the southern point of this continent, a new change passes over the face of nature; tropical forms disappear as they have formerly appeared, and we lose the scenery of the cotton tree, the baobab, the palm, and the chandelier tree; not, however, to find their places occupied by the plants of Barbary and the north, but to contemplate an order of vegetable beings so different that their very genera had been previously unseen: still the same wilderness of sand and drought occupies the centre of the country, but it is no longer covered with prickly grasses or waving thickets of papyrus. The karroos of the Cape Colony are the residence of fleshy, leafless, distorted, shapeless tribes of Stapelias, of Mesembryanthemums, Euphorbias, Crassulas, Aloes, and other succulent plants, each holding to the soil by the weak support of a single wiry root, and feeding rather upon the dews of heaven than the moisture of the soil,—a situation to which they are admirably adapted by the want or imperfect

state of their evaporating pores, so that whatever humidity they are able to collect is parted with as slowly as the limited supply is furnished to them.

Such are the more prominent features of the vegetation of Africa. Its islands partake more or less of the nature of the Flora of the adjacent continent, modified chiefly on the west side by the cooling breezes of the Atlantic, and on the east by the wide expanse of the Indian and Southern oceans. In these spots we have usually a total absence of African sterility, in consequence of their insular position; and from their luxuriant vegetation we may judge what that of Africa would be, if either nature or the skill of man could succeed in conducting rivers and streams where there are now only barrenness and drought.

Zoology.—The zoology of Africa is but partially known; every day indeed the researches of travellers bring new objects under our notice; still, when we consider that the whole of the interior of this vast continent may be almost literally termed a *terra incognita*, we have good reason (judging from what partial explorers have done) to believe that our acquaintance with the Fauna of Africa is at present very limited. Looking at the mammalia, Africa is confessedly strong in feline animals, in Pachydermata, and antelopes. Though the lion is found in Asia, Africa is its stronghold; its range extends from the northern coast to the settlements at the Cape of Good Hope. The tiger is exclusively Indian, but leopards, panthers, and smaller feline animals are extremely numerous. With respect to the canine race, there are various species of foxes and fox-like animals, among which we may notice the fennec, besides the hunting dogs (*Lycaon*), and true wild dogs, of which little is known. Of hyænas three species are well known, one of which, the striped, is common to the warmer parts of Asia, as Turkey, Persia, Syria, India, &c., as well as to Northern and Central Africa. In other carnivora, as the aard-wolf, civets, genets, ichneumons, and species of the weasel tribe, Africa is by no means deficient. It has been long believed that no species of bear inhabits Africa, but it is now ascertained that the bear inhabits the range of the Atlas and the Tetuan mountains; and Ehrenberg hunted a bear in Abyssinia, where it is called by the natives *Karrai*.

The indigenous Pachydermata are, the elephant, the hippopotamus (perhaps two species), the zebra, the dauw, the quagga, and perhaps one or two allied species as yet imperfectly known; the wood-swine, and two species of masked swine (*Phacochœrus*); three species of two-horned rhinoceros, probably more, and, as it would appear, also a single-horned species. We must not omit the daman or hyrax. Africa has no deer excepting along its northern border, where the fallow deer, or a closely allied species, exists; but is rich in antelopes, some of which tenant the wide karroos and table lands, others the woods and dense jungles, and a few the crags of the rocks. Some of the antelopes, as the canna, the koodoo, the oryx, &c., are very large and powerful; others, as the gazelle, the spring-bok, &c., are remarkable for their light and graceful forms, and the swiftness of their movements. Various wild buffaloes, powerful and savage, are peculiar to the African continent; some species of ibex inhabit the mountains of Abyssinia and Nubia; and the aoudad (*Ovis tragélaphus*, Pallas) ranges the craggy heights of Barbary, Abyssinia, Tunis, and Northern Africa generally. The tall and graceful giraffe (if the species be identical) is found in Nubia, Abyssinia and the adjacent countries, as well as in the more central regions and the districts of Caffraria.

Of the Edentata, the great seat of which is South America, Africa possesses only a few species of manis and the aard-vark. With respect to Quadrumana, as apes, monkeys, lemurs, &c., Africa has its fair share—that is, including Madagascar, the stronghold of the true lemurs. The genera Troglodytes, Papio or Cynocéphalus, Inuus, Cercopithécus, and Cólobus, are peculiar to Africa. Of these animals the most remarkable is the chimpanzee (*Troglódytes niger*), a native of Benin, Congo, Angola, &c.; and we may also mention the ferocious mandrill (*Cynocéphalus mormon*).

Of the Cheiróptera, or bat tribe, the species are numerous, among which we may notice the gigantic fruit-eating bat or roussette (*Ptéropus*), common in Madagascar and the Isle of France.

Africa does not abound in Rodents; it possesses, however, some interesting forms, as the leaping hare of the Cape, the jerboa, the porcupine, various species of coast-rats which burrow in the sandy tracts, several interesting forms of murine animals, hares, &c. Among the Insectivora may be noticed the Cape chrysochlore, the elephantorhinos, so called from its long and flexible nose, various species of hedgehog, and in Madagascar the tenrec, a form allied to the hedgehogs.

Among the cetaceous animals visiting the coast, we may mention the cachalot or spermaceti whale, and various species of porpoises, grampuses, &c.; but these roam almost all seas. Of animals usually classed among whales, but which in reality are aquatic Pachydermata (aquatic gravigrades of De Blainville), a species of Dugong (*Halicore tabernaculi*) inhabits the Red Sea, and a species of Lamantin (*Manatus Senegalensis*) is found in the mouths of the rivers of Western Africa.

Among domestic quadrupeds, the horse, the ox, the buffalo, the sheep, the goat, and the camel, may be enumerated. It is in the northern and central regions that the camel and buffalo are used. Dogs are numerous, and in Mohammedan towns have no particular owners, but are tolerated for their utility. The domestic cat is rare.

Africa is the great winter retreat of many of our birds of passage, and particularly the swallow tribe, the quail, the cuckoo, &c. Along its northern boundaries there are many species common also to Western and Eastern Europe, but Africa possesses its own peculiar species. Eagles, hawks, owls, and vultures, are innumerable; as are also birds of most other orders. Africa is, however, only sparingly supplied with those of the Gallinaceous order, the genus Numida,

comprising several species of Guinea fowl—certain francolins, sand-grouse, and partridges being the chief African representatives of this valuable group. Everywhere in the wide plains and deserts the ostrich rears his tall form, and 'scorneth the horse and his rider.' The serpent-eating secretary bird inhabits Southern Africa and Senegambia,—parrots abound in the woods. The republican weaver-bird loads the branches with its nests; and brilliant species of the cuckoo tribe dart on rapid wings in chase of their insect prey. Of these, one species, the honey-guide, indicates to the Caffre or Hottentot the hollow tree in which the bees have built their cells. There are no humming birds, but brilliant sunbirds (*Cinnyridæ*) supply their place. Reptilia—crocodiles, huge lizards, gigantic boas, tree snakes, deadly cobras, vipers, asps, &c., everywhere are common; and Amphibia abound in the swamps. Of the poison of some of the deadly species of reptiles the Bushmen make a preparation with which they smear the points of their arrows.

The coasts of Africa abound with fish; but of these we need not speak, nor of the lower orders of the animal creation with which the wide-spread ocean is replete.

Insects of forms innumerable Africa contains in hosts. The locust, as in the earliest times, is still the scourge of the whole continent. By many tribes this insect is eaten, not only in times of scarcity but as relished food; anciently they formed part of the diet of the Ethiopians. On the plains and in the woods the termites rear their huge domelike structures of clay; and the zimb of Bruce, the zebule or fly, is still the plague of the low and cultivated districts along the course of the Nile and its tributaries.

Such is a rapid outline of the zoological features of Africa. Of course we do not pretend to enter into minute details, but we have said sufficient to give some idea of the more prominent features of the Fauna of this imperfectly explored continent.

AFRICAN ASSOCIATION, a society which was formed in London, in the year 1788, with the design of encouraging men of enterprise to explore the interior of Africa; of acquiring by their means a knowledge of the character of the native inhabitants; and of being enabled to introduce among them the arts of civilization. The Association, during the period of its labours as a distinct body, commissioned for their objects several travellers, whose zeal and ability have furnished the best evidence of the correctness of the Association's choice.

The first person thus commissioned was John Ledyard. While preparing himself for his undertaking, in August, 1788, Mr. Ledyard was seized with a bilious fever, and died at Cairo. His successor was Mr. Lucas.

The next person engaged by the Association was Major Houghton. He arrived at the mouth of the river Gambia in November, 1790, and after various adventures attended with severe privations, died at Jarra, in September, 1791, not without strong suspicions of having been murdered. Without being discouraged by these repeated disappointments, the Association sought for some other person to prosecute their plans, and were fortunate in meeting with Mungo Park, who sailed in May, 1795. The second journey of this adventurous traveller, in 1804, was undertaken at the expense of Government.

The Association subsequently engaged Mr. Hornemann, a German; Mr. Nicholls; and a young German named Roentzen. The last missionary of the Association was John Lewis Burckhardt. He sailed for Aleppo in March, 1809, and died at Cairo in 1817.

Repeated failures appear at length to have discouraged the Association from engaging other missionaries. A great deal of information, connected with the geography of Africa, was collected by them from various sources during the period of their active labours; and this information was communicated to the public in the occasional printed reports of their proceedings. The Association has merged in the Royal Geographical Society, into which body its few remaining members were admitted in 1831.

(*Proceedings of the Association*, from 1794 to 1805; Leyden's *History of Voyages and Discoveries in Africa*, edited by H. Murray; and *Journal of the London Geog. Soc.* vol. i. p. 257.)

AFRICAN COMPANY, a regulated trading company, established by the act 23 Geo. II. cap. 31 (1754). In the course of time it happened that the whole expense of the Company came to be defrayed by the public, and for this reason the charter of its incorporation was recalled by Parliament in 1821 (1 & 2 Geo. IV. cap. 28). The possessions of the Company on the west coast of Africa were by this act annexed to and made dependencies upon the colony of Sierra Leone.

AFRICAN INSTITUTION, a society established in London, in April, 1807, the declared objects of which were to collect accurate information respecting the African continent and its inhabitants, to cultivate friendly relations with the African people, and to introduce among them the arts of civilization. As an important instrument for promoting these objects, the members of the institution were invited to devote their individual attention and united influence to obtain the enforcement of the law, then recently passed, for abolishing the African slave trade, and to expose all attempts to evade its provisions. In this part of its functions the vigilance of the institution was unceasing; and the exertions of the directors were successfully applied towards obtaining an Act of Parliament declaring the trading in slaves to be felony.

AFRICA'NUS, LEO. [LEO AFRICANUS.]

AFRICA'NUS, SEXTUS CÆCI'LIUS, a Roman jurist. One hundred and thirty-one excerpts from his Nine Books of Quæstiones are contained in the Digest. Africanus often cites the 'Responsa,' or opinions of Salvius Julianus, who lived under Hadrian; and he was a pupil or friend of Julianus, and consulted him. (*Dig.* 25, tit. 3, s. 3.) This fixes the period of Africanus to the reign of Hadrian, who died A.D. 138, and to that of his successor Antoninus Pius. The excerpts of Africanus are difficult to understand;

they treat of many subtle legal points, and have been well illustrated by Cujacius. (*Opera*, tom. i. tract. 9, ed. Neapol. 1758.)

The jurist Africanus, mentioned by Lampridius (*Alex. Severus*, c. 68) as living in the reign of Alexander Severus, is a different person from this Africanus; or Lampridius has made some blunder, either in the name or in the period to which he assigns this jurist.

AFRICA'NUS, SEXTUS JULIUS, a Christian writer of the third century, is considered by some authors to have been a native of Africa, and was, according to Cave, bishop of Emmaus, A.D. 232. Clavier, in the *Biographie Universelle*, makes him the descendant of an African family, and born in Palestine. Between the years 218 and 222 A.D., Africanus was employed in an embassy to the Emperor Heliogabálus for the restoration of Emmaus, which city, in consequence of his entreaties, was rebuilt under the name of Nicópolis. He attended the lectures of the Bishop Heraclius at Alexandria, some time before the year 231.

Eusebius ascribes to Africanus a work which contains, under the title *Kesti*, a collection of passages from various authors, chiefly on physical, mathematical, and other topics. Valesius, Scaliger, and others, attribute this collection to a pagan philosopher called Sextus.

Africanus wrote a chronological work in five sections, under the title of 'Pentabiblos,' a sort of universal history, composed to prove the antiquity of true religion and the novelty of paganism. Fragments of this chronology are extant in the works of Eusebius, Syncellus, Málala, Theóphanes, Cedrenus, and in the 'Chronicon Paschale.' The 'Pentabiblos' commences with the Creation, 5499 B.C., and closes with 221 A.D. The chronology of Africanus places the birth of Christ three years before the commencement of our æra. But under the reign of Diocletian ten years were taken from the number which had elapsed, and thus the computation of the churches of Alexandria and Antioch were reconciled. [ÆRA.]

Africanus also wrote on the apocryphal history of Susanna, and on the genealogies of Christ in Matthew and Luke.

The fact of a man so learned and intelligent as the chronologer Africanus being a Christian, refutes the error of those who think that all Christians in the first centuries of our æra were illiterate. The criticisms of Africanus upon the apocryphal books seem to attest that he did not receive the canonical writings of the New Testament without previous examination; and from his manner of reconciling the different genealogies of Christ, it appears certain that he recognised the authenticity of the Gospels in which they occur.

AFTER-MATH is the grass which grows after the hay has been made; it is also called latter-math, rowen, or rowett, and when left long on the ground it is called fogg in some places. Where the land is rich and hay valuable, the after-math is often mown and made into hay. This hay is inferior in value and nourishment to the first crop, which contains the flower-stalks of the grass. It is not good for horses, especially those which are driven fast and work hard; it is thought injurious to their wind. Cows and sheep are fond of it, and with them it is not liable to the same objection.

AGA, the name of a dignity, and also an epithet of respect, among the Turks. It signifies literally, a great man, a lord, or a commander.

AGALMATOLITE. [ZEOLITES.]

A'GAMA, a genus of Saurian or Lacertine Reptiles, commonly called Lizards, which ranges under the family of Iguanas. The genus Agama was left in great confusion till very recently, owing to the application of the term by Linnæus to an American lizard, under the impression that this was its native name (whereas it is borrowed from the Greek word ἄγαμος, unmarried); and its adoption by Daudin as a generic appellation for species both of the old and new world. (Cuvier, 'Règne Anim.' vol. ii. note 2, p. 85, and note 1, p. 36.)—MM. Dumeril and Bibron have remodelled this genus, *Agama*, of which the following are the characters: head triangular, more or less abbreviated; tongue spongy, short, notched anteriorly; nostrils on each side of the muzzle, at a little distance from its apex. Incisor teeth, from two to five in the upper jaw. Tympanic membrane, deep in the auditory orifice. A longitudinal fold under the throat; and another often double across the neck. Tail compressed and conical, with the scales not distinctly verticellated. Anal pores,—no femoral pores. The neck and parts about the ears are often furnished with spines, either isolated or in clusters. The *Agamas* are all small animals, short and thick bodied, capable of inflating the skin, and of unpleasing aspect; they tenant ruins, heaps of stones, and rocks, concealing themselves in the chinks and fissures, and their dull and sombre hues tend in such places to their security. Ten species are described by MM. Dumeril and Bibron;—of these two are Indian, viz. *Agama dorsalis* and *Agama tuberculata;* the others are African and Syrian, viz. *Agama Colonorum*, of Guinea and Senegal, which Daudin regarded as American; *Agama atra*, eastern and southern Africa; *Agama agilis*, Arabia, and the environs of Bagdad; *Agama aculeata*, eastern and southern Africa; *Agama spinosa*, south Africa; *Agama mutabilis*, Egypt, Arabia, Persia; *Agama Savignii*, Egypt; *Agama Sinaita*, north Africa and Syria. ('Erpétologie Generale,' by MM. Dumeril and Bibron, vol. iv. p. 41, et seq.)—Other species more recently discovered by travellers will probably come within this genus.

In Mr. Gray's arrangement the *Agamas* constitute a family including several genera or subgenera ('Annals of Philosophy,' 1825), and in Cuvier's Animal Kingdom the same view of the group *Agama* is entertained.

A'GAMÆ, in botany, is a name given by some authors to the large division of the vegetable kingdom called Flowerless, and may be considered equivalent to the older term, Cryptogamic plants.

AGAME'MNON, king of Mycénæ, and commander-in-chief of the Grecian army at the siege of Troy. Passing over the fabulous genealogies of the poets, we may trace Agamemnon through

those relations which appear to bear some mark of historical truth. He was the son of Atreus, whence he and his brother were called Atrídæ, and he married Clytemnestra, sister of Helen. The Trojan war arose out of the abduction of Helen by Paris, son of Priam, king of Troy. It is commonly said, that a number of the princes of Greece having been drawn together as suitors by the extraordinary beauty of Helen, Tyndareus exacted an oath from them, that on whomsoever the choice should fall, if the maid should be carried off, all the rest should unite to recover her; and that, in virtue of this oath, the confederate princes assembled under the command of Agamemnon.

The assembled fleet was detained at Aulis by contrary winds. The seer Calchas, being consulted how the anger of the gods might be averted, and the delay obviated, declared that Iphigenía, daughter of Agamemnon, who had incurred the displeasure of Diana by killing her favourite stag, must be sacrificed to the goddess. The natural reluctance of the father was overcome by importunity and ambition; and the intended victim was summoned to Aulis, under pretence of betrothing her to Achilles. At the point of death she was miraculously saved by Diana, whose priestess she afterwards became among a savage people of Asia called the Tauri. This story is related neither by Homer nor Hesiod; it rests, however, on the early authority of Pindar ('Pyth.' III.) and Æschylus; and is pregnant with too important consequences to be omitted, since the alienation of Clytemnestra from her husband is said by those authors to have originated in her horror of this unnatural action. The siege of Troy was protracted for ten years. The most memorable event of it is the quarrel between Agamemnon and Achilles, the subject of the Iliad. 'King of men' is the distinguishing epithet constantly added to the name of Agamemnon, as 'swift footed' is to the name of Achilles. Returning from Troy he was treacherously murdered by his wife, who, during his absence, had formed an adulterous attachment to Ægisthus, son of his uncle Thyestes. This catastrophe is the subject of the 'Agamemnon' of Æschylus, one of the most sublime compositions in the range of the Grecian drama. Orestes, son of Agamemnon, then a child, was saved by the care of his tutor and timely flight. After passing seven years in exile he returned in secret, avenged his father's death by the slaughter of his mother and of Ægisthus, and recovered his paternal kingdom, which he ruled with honour. These legends of the house of Agamemnon formed a favourite subject with the Greek tragedians. Three of the seven remaining plays of Æschylus are founded on it, the 'Agamemnon,' the 'Choéphori,' which has for its subject the revenge of Orestes, and the 'Eumenides,' which relates the remorse and madness of Orestes, and his trial and acquittal before the Athenian court of Areópagus. The 'Electra' of Sophocles has the same subject as the 'Choéphori.' Euripides has two tragedies on the story of Iphigenia; and one called 'Electra,' which has the same subject as the 'Choéphori' and 'Electra' of Sophocles, but is much inferior to both of them. The 'Orestes' of the same author relates the history of Orestes subsequent to the death of Clytemnestra.

A'GAMI (*Psophia crepitans*, Latham), a large and very beautiful bird, often called the gold-

The Agami.

breasted trumpeter, a native of tropical America. Though not strictly speaking a wading bird, yet it is classed by most naturalists in the order Grallatores, and is placed by Cuvier and others in the family Gruidæ, or Cranes. Brisson, however, regards it as a gallinaceous bird, and places it among the pheasants. Temminck places it in a genus among the Alectorides (Curassows). It is an anomalous form intermediate between the cranes and the bustards, and may be considered as the American representative of the latter, which are confined to the Old World (Europe, Asia, and Africa).

The trumpeter is an inhabitant of the upland forests and mountains of the warmer parts of South America, where it lives on fruits, seeds, &c. It is gregarious, associating in large flocks, and walks and runs with great swiftness, seldom taking wing except when hard pressed, and then only skimming a few feet above the surface of the ground. The flesh is said to be agreeable. These birds utter a peculiar hoarse cooing or trumpet-like sound, preceded by a wild cry, without opening the bill. This noise is produced by a peculiar construction of the trachea, to which certain air-sacs are attached, and which are influenced by muscular pressure.

The Trumpeter, or Agami, makes no nest, but scratches a shallow place at the foot of a tree, where it deposits its eggs, from ten to sixteen in number, and of a light green colour. They are somewhat larger than those of a hen, and of a rounder form. When taken young and brought up, the Agami becomes very docile and familiar,

and displays great attachment to those who feed and notice it, but is jealous of all rivals. Monoucour says it may be trained like a dog to tend a flock of sheep, as he was assured; but we may doubt this without the imputation of scepticism. "

In the size of the body the Agami equals a large fowl, but in consequence of the length of its neck and legs stands very much higher. The beak is short; the head, except a naked circle round the eyes, and the whole of the neck, are covered with black velvety feathers; on the breast they become large and rounded, their edges being of a glossy metallic purple and green. The back is covered with long silky plumes of a delicate grey, which hang gracefully over the wings; these latter are black, as are also the tail and under surface; the feathers of the tail are soft and short; those of the under parts loose and hairy; bill, black; legs, olive green.

A'GAPÆ, a term often used by ecclesiastical historians, signifying those meetings of the early believers in Christianity which have been also called love-feasts. The word Agapæ is derived from a Greek word signifying love, or charity. In the 12th verse of the Epistle of Jude, where we read, 'these are spots in your feasts of charity,' the Greek word is ἀγαπαις. It would appear that as early as the days of the apostles these meetings were occasionally perverted from the purpose of their institution; but love-feasts continued to be generally celebrated for several centuries, till in the middle of the fourth century they were expressly forbidden in the churches.

AGAPHITE. [TURQUOISE.]

AGARI'CIA (Lamouroux), a genus of coral madrepores, called mushroom corals from their similarity to mushrooms (*agarici*). They are found in the warmer seas.

AGA'RICUS is the generic name by which all the species of mushrooms, properly so called, are collectively known. It comprehends such plants of the fungus tribe as have a cap (or pileus) of a fleshy nature, supported upon a distinct stalk, and a number of parallel unequal vertical plates or gills arising out of the cap, and inclosing the particles by which the species are reproduced; particles which the vulgar call seeds, and the learned sporules. This genus consists, according to the latest writers, of not fewer than a thousand species, inhabiting meadows, and heaths, and rocks, and masses of decaying vegetable matter, in all Europe, and in many other parts of the temperate regions of the earth. Among them a large proportion are poisonous, a few are wholesome, but by far the greater are altogether unknown in regard to their action upon the human constitution. The species are often extremely similar; there is no means of distinguishing botanically the tribes that are poisonous from such as are wholesome, but in every case practice is requisite to determine that point independently of general structure. It is for this reason that the use of wild mushrooms is so dangerous, and that a French botanist, of no little celebrity, would never suffer any to be brought to his table that had not been raised by art in a garden. Indeed there is this most remarkable fact connected with their qualities; a fact which seems to show that their properties depend upon climate and situation, and accidental circumstances, rather than upon any specific peculiarities, that those kinds which are wholesome in one country are not so in another; thus, in Great Britain, the common mushroom (*Agaricus campestris*, fig. 1), the fairy-ring

Eatable Agarici.

Poisonous Agarici.

agaric (*A. pratensis*, fig. 2), and the *A. Georgii*, are the only sorts that it is quite safe to eat; while the Fly agaric (*A. muscarius*, fig. 3), and *A. virosus* (fig. 4), are extremely poisonous. But in other countries of Europe it is different. In France, in Italy, and especially in Russia, a usual aliment is afforded by a great variety of species, which, although very common in this country, it would be extremely dangerous to eat; and, on the other hand, even the dangerous *A. muscarius* is a species of food in Kamtchatka.

We propose to point out in this article what the distinctions are, by which it has been supposed that the eatable and poisonous species may be recognised, because the reader of such a work as this would be more likely to be misled by imperfect descriptions than benefited by speculative distinctions. We shall therefore confine ourselves to a few easy, plain, and intelligible observations, which it is to be hoped cannot possibly lead to error.

Of the thousand species thus much is certain, that all having the following characters are poisonous:—

1. Such as have a cap very thin in proportion to the gills.

2. Such as have the stalk growing from one side of the cap.

3. Those in which the gills are all of equal length.

4. Such as have a milky juice.

5. Such as deliquesce; that is, run speedily into a dark watery liquid.

6. And lastly, every one that has the collar that surrounds the stalk filamentous, or resembling a spider's web.

As to the rest, the *only eatable* kinds that can be safely employed in Great Britain are the following:—

A. campestris, the common mushroom (fig. 1), the species that is so commonly raised artificially for food. This is readily known in any state by its fragrant odour, by which alone it may be always recognised, and the absence of which is extremely suspicious. When in a very young state, it resembles little snow-white balls, which are called *buttons;* afterwards it acquires a stalk, separates its cap, and becomes shortly conical, with liver-coloured gills, and a white, thick, fleshy cap, marked with a few particles of grey. At a more advanced age, the cap is concave, the colour grey, and the gills black; in this state it is called a *flap*. For the method of cultivating it, and for its physiological characters, see MUSHROOM.

A. Georgii is like the latter, but its gills are always very pale, and its flavour inferior. It is said occasionally to weigh as much as fourteen pounds.

A. pratensis, or *orcades*, the fairy-ring mushroom, is so well known by its popular designation as to require no description. It may easily have gained that name; for, in former times, there would doubtless be great difficulty in imagining how such productions could spring up in a few hours in the regular rings they appear in, without the aid of some supernatural agency. The use to which this species is usually applied is that of being powdered and mixed with rich sauces, after having been previously strung upon a line, and dried in the shade.

AGA'SIAS, a Greek sculptor of Ephesus, whose age is not accurately known. The statue now at Rome called the Borghese Fighter, which is a fine specimen of skill in representing a figure in action, and also shows a careful study of external anatomy, is the work of this Agasias. On the support behind the figure is the following inscription in Greek—*Agasias the son of Dositheus of Ephesus made it.*

AGATE, sometimes called *Scotch Pebble*, is an ornamental stone used in jewellery. It is one of the many forms under which silica presents itself, almost in a state of purity: constituting in the agate 98 per cent. of the mineral. It presents a semi-translucent mass with a sort of resinous fracture; and is sometimes tinted by a minute quantity of iron. The variations both of translucency and of tint in the same stone are often so great as to give much richness of appearance; and this combined with the high polish which they are capable of receiving, imparts great value to some specimens of agate.

These stones generally occur in the form of detached rounded nodules, in a variety of the trap rocks called Amygdaloid. The particles often arrange themselves in layers parallel to the surface; and the centre has in some specimens a hollow space containing crystals of other minerals.

Mineralogists conjecture that agates are formed in a kind of lava produced by igneous or volcanic action. Two points come successively under notice: the formation of vacant spaces in the trap rock; and the filling up of these spaces with nodules of agate. With regard to the first, an analogy is furnished by the lava of volcanoes. Gases are evolved in great quantities by volcanoes; and if produced at the same instant with a flow of lava, they would rise in bubbles in the melted mass; but in proportion as that became more viscid they would rise with greater difficulty to the surface; and when it consolidated would form cavities, the shape of which would be determined by the nature of the pressure of the surrounding viscid lava. It is supposed that the cavities in which nodules of agate are found were formed in this way.

In respect to the second point, the formation of the agate itself, three different theories have been broached. One theory supposes a siliceous matter to have been introduced in aqueous solution from without, and to have been gradually deposited in the cavities. Another is based on the supposition that, in obedience to some peculiar laws of attraction, siliceous particles have been separated from the mass of the surrounding rock, and precipitated into the hollow left by the gases. The third theory supposes that the hollows were filled by the sublimation of the silica and other materials from the rest of the mass by the action of heat. It is generally admitted that none of these theories are free from objection, and that more inquiry is necessary to solve the question of the formation of agate.

There are many gems which so closely resemble the agate in chemical constitution as to render it convenient to notice them briefly in this place. *Carnelian* or *cornelian* is coloured with shades of red and yellow: the deep clear red being the rarest and most valuable. It is brought chiefly from the East Indies, and is much used for engraved seals. *Calcedony* presents generally a milky white or pale yellow colour, with very often a wavy internal structure. It is sometimes met with in the British isles, in such large masses as to be formed into cups and other vessels. *Onyx* has the particles arranged in parallel layers: white alternating with blue, grey, or brown. The onyx was much used by the ancients for cameos: the figure or device being cut out of the opaque white, and the dark part forming the ground. A Roman cameo of this kind, in the Royal Library at Paris, measures as much as 11 inches by 9. *Sardonyx* is a variety of the onyx, in which the opaque white alternates with a rich deep orange brown of considerable translucency. *Mocha Stone* is a semi-transparent calcedony, in which varied tints are produced by the presence of iron and other bodies. *Moss Agate* closely resembles Mocha stone. *Blood-stone* is a green agate, coloured with bright red spots like drops of blood. *Chrysoprase* and *plasma* are two varieties of calcedony having a green tint.

AGATHA'RCHIDES, a Greek writer on geography, a native of Cnidos, in Asia Minor. He

was living in the time of Ptolemy VI., called Philométor, king of Egypt (who died B.C. 146), and also after this date. He wrote numerous works on geography and other subjects, and among them one on the Erythræan Sea.

This work is now only known by extracts from the first and fifth books preserved by the Greek patriarch Photius, and some extracts in Diodorus. The works of Agatharchides contained much useful information. He is the earliest extant writer who attributes the annual rise of the Nile to the periodical rains in the upper regions of that river (Diodorus, i. 41): he has left a very minute account of the mode of working the gold mines between the Nile and the Red Sea; and he is the first extant writer who has mentioned the giraffe, or camelopard (*Camelopardalis*). He has also remarks on the mode of hunting elephants, and on the inhabitants of the west coast of the Red Sea.

The remains of Agatharchides are in Hudson's *Minor Greek Geographers*, vol. i. The description of the gold mines is also in Diodorus, iii. 12.

AGATHA'RCHUS, a Greek painter, who apparently, from a passage in Vitruvius, may be considered, if not the inventor, at least the first artist who applied the laws of perspective practically in painting. He painted a dramatic scene for Æschylus in perspective, which was the first work of the kind exhibited to the Greeks; as the contemporary of Æschylus, therefore, he was a man of mature years about 480 B.C.

The words *scenam fecit*, in the passage in Vitruvius referred to, have been interpreted, 'he constructed a stage,' but this interpretation is shown by the context to be incorrect; the whole passage is as follows:—'When Æschylus was exhibiting tragedies at Athens, Agatharchus *made a scene*, and left a treatise upon it. With the assistance of this treatise, Democritus and Anaxagoras wrote on the same subject, showing how the extension of rays from a fixed point of sight should be made to correspond to lines according to natural reason, so that the images of buildings in *painted scenes* might have the appearance of reality; and, although painted upon flat vertical surfaces, some parts should seem to recede and others to come forward.'

This kind of scene-painting was termed Scenography (σκηνογραφία) by the Greeks, and was sometimes practised by architects. Diogenes Laertius mentions Clisthenes of Eretria as scenograph and architect. Aristotle gives Sophocles the credit of introducing scene-painting; he may have first treated it as indispensable in a dramatic representation, and rendered the practice common, or Vitruvius may have erroneously ascribed its introduction to Æschylus instead of Sophocles.

There was another Greek painter of the name of Agatharchus, who lived about half a century later than the above.

(Vitruvius, vii. *Præf.*; Diogenes, ii. 125; Aristotle, *Poetic*, iv.)

AGATHE'MERUS, a Greek writer, who probably lived about the middle of the third century after the Christian æra, and wrote a short treatise on general geography. His work, as we now possess it, is merely a collection of short heads, or a kind of syllabus for lectures. There are two books extant, of which the second is in a very confused state. The remains of Agathemerus are in the second volume of Hudson's 'Minor Greek Geographers.'

AGA'THIAS, a Greek historian and poet, who lived under the emperors Justinian and Justinus the Younger. He was born at Myrina, in Asia Minor, about A.D. 536, but he received his education at Alexandria, whence he went in A.D. 554 to Constantinople. He died about A.D. 582, in the reign of Mauritius Thrax.

Agathias, in addition to poems which are lost, was the author of epigrams which are still extant in the 'Greek Anthology,' and show that Agathias had considerable poetical talent and wit. The 'History of his Own Time' is the most important among his works. It was commenced at a late period of his life, and contains the history of the short period from A.D. 553 to 559. He appears throughout this work as an honest man and a faithful historian.

A'GATHIS is the generic name given by botanists to the trees known in common language by the name of Dammar Pine, and Kawrie Pine. These plants belong to the natural order Coniferæ, from all other species of which they are known, firstly, by their broad, lance-shaped, leathery leaves, the veins in which are numerous and nearly parallel, diverging a little at the base, and converging at the apex; and, secondly, by their seeds having a wing on one side instead of proceeding from the end.

AGA'THOCLES, a Syracusan of low extraction, who became ruler of Syracuse and great part of Sicily. The principal events in his life range between the years B.C. 330 and B.C. 289. [SYRACUSE.]

AGATHODÆ'MON, of Alexandria, a map-maker, and apparently the author of the maps found in the oldest MSS. of the geography of Claudius Ptolemæus. But, as we know nothing at all about the age of Agathodæmon, we cannot conclude, as some do, that he constructed Ptolemy's maps for him. It is more likely that he was a later editor or amender of them. The shape which Agathodæmon gave to the different countries of the earth, maintained its ground on modern maps till the system of regular surveys became in use; and indeed till of late years many features of our maps were only the traditional delineations of the old map-makers of Alexandria. (Heeren, *De Fontibus Ptolomæi.*)

A'GATHON, a native of Sicily, succeeded Domnus in the see of Rome, A.D. 678. Died A.D. 682.

AGATHO'TES CHIRAYTA, the name of a plant belonging to the tribe Gentianeæ, and so greatly resembling a Gentian that it is referred to that genus by Dr. Wallich. It has been known for a great length of time as a remedy in India, but has only recently been introduced into European practice. The genuine Chirayta is an annual plant, about three feet high, flowering in the rainy season. The whole plant is taken up, and

the proper time for collecting it is just when the flowers begin to wither. When dried it has an intensely but agreeable bitter taste, and is destitute of aroma. The root is possessed of the greatest bitterness. The bitter principle is readily imparted to water and to alcohol. According to Mr. Battley it contains a free acid, a bitter resinous extractive, with much gum, and chlorates, with sulphates, of potass and lime. No alkaloid has been detected in it; what is therefore sold as a sulphate of chirayting is well known to be only the disulphate of quinia. In regard to the pharmaceutical preparations of chirayta, infusion and watery extract, or a tincture of it, are alone to be recommended.

Chirayta possesses the general properties of bitter tonics, but has at the same time some peculiar to itself, which fit it well for certain forms and complications of disease. Unlike most other tonics, it does not constipate the bowels, but tends to produce a regular action of the alimentary canal, even in those subject to habitual constipation. During its use the bile becomes more abundant and healthy in character. The tendency to excess of acidity in the stomach, with disengagement of flatus, is much restrained by its use. These qualities fit it in a most peculiar degree for the kind of indigestion which occurs in gouty persons. It may, when necessary, be associated with alkaline preparations or with acids; the latter are generally preferable. The same remark applies to its employment in the treatment of scrofula, in which alkalies are so freely and often injuriously employed.

AGA'VE, in Botany, comprehends those plants which gardeners call American aloes.

There are many species of this genus, one only of which requires to be mentioned.

Agave Americana.

Agave Americana, or the American Aloe, is a plant which, when full grown, has a short cylindrical woody stem, which is terminated by hard, fleshy, spiny, sharp-pointed, bluish-green leaves, about six feet long, and altogether resembling those of the arborescent aloes. It is commonly supposed that this plant only reaches maturity at the end of one hundred years; but this, like many other popular opinions, is an error, the period at which the agave arrives at maturity varying, according to circumstances, from ten to fifty or even seventy years. In hot or otherwise favourable climates, it grows rapidly and soon arrives at the term of its existence; but in colder regions, or under the care of the gardener, where it is frequently impracticable to attend to all the circumstances that accelerate its development, it requires the longest period that has been assigned to it. Having acquired its full growth, it finally produces its gigantic flower-stem, after which it perishes. This stem is sometimes as much as forty feet high, and is surrounded with a multitude of branches arranged in a pyramidal form, with perfect symmetry, and having on their points clusters of greenish yellow flowers, which continue to be produced for two or three months in succession. The native country of the American aloe is the whole of America within the tropics, from the plains nearly on a level with the sea, to stations upon the mountains at an elevation of between 9000 and 10,000 feet.

Uses.—The sap may be made to flow by incisions in the stem, and furnishes a fermented liquor, called by the Mexicans *Pulque;* from this an agreeable ardent spirit, called *Vino Mezcal*, is distilled. The fibres of the leaves form a coarse kind of thread; the flowering stems dried make an almost imperishable thatch; an extract of the leaves is made into balls, which will make a lather with water; the fresh leaves themselves cut into slices are occasionally given to cattle; and finally the centre of the flowering stem split longitudinally is by no means a bad substitute for a European razor strop, owing to minute particles of silica forming one of its constituents.

AGE. (Physiology.) The term of human existence is divisible into distinct periods, each of which is distinguished by characters peculiar to itself. These characters, as far as they are external, are obvious to every one; but these external characters depend on internal states which are not obvious, and which have been discovered only by careful and persevering research. And the curious and interesting facts which those researches have disclosed, show that the different epochs into which life is divided are not arbitrary distinctions, but arise naturally out of constitutional differences in the system, dependent on different physiological conditions. The natural epochs of human life are six, namely, the periods of infancy, childhood, boyhood or girlhood, adolescence, manhood or womanhood, and old age. The space of time included in the first four of these periods is fixed. In all persons, after the lapse of a certain number of years, a definite change in the system uniformly takes place, in consequence of which the peculiarities which distinguish one period give place to those which characterise the succeeding. Thus the period of infancy, commencing at birth, extends to the end of the second year, the point

of time at which the first dentition is completed: the period of childhood, commencing at the close of the second year, extends to the termination of the seventh or eighth year, the point of time at which the second dentition is completed; the period of boyhood or girlhood extends from the seventh or eighth year to the commencement of the age of puberty; that is, in general, in this country, in the female from the twelfth to the fourteenth year, and for the male from the fourteenth to the sixteenth year; the period of adolescence extends from the commencement of the period of puberty to the twentieth year of the female and the twenty-fourth of the male; the period of womanhood extends from the twentieth year, and of manhood from the twenty-fourth year, to an age neither determined nor determinable with any degree of exactness; because the point of time at which mature age lapses into old age differs in every individual. It differs in many cases by a considerable number of years; and it differs according to primitive constitution, to the management of early infancy and childhood; according to regimen, exercise, occupation physical and mental, and the several other circumstances included under the general term 'mode of life.'

The changes which take place in the system at the different epochs of life, consist of changes in the physical condition of the body which it will be useful briefly to trace. These changes are intimately connected with and are mainly dependent on the operation of a principle of consolidation, the influence of which, commencing at the first moment of existence, continues, without intermission, until the last moment of life.

When first the human embryo becomes distinctly visible, it is almost wholly fluid, consisting only of a soft gelatinous pulp. In this gelatinous pulp solid substances are formed, which gradually increase and are fashioned into organs. These organs, in their rudimentary state, are soft and tender, but in the progress of their development constantly acquiring a greater number of solid particles, the cohesion of which progressively increases, the organs at length become dense and firm. As the soft solids augment in bulk and density, bony particles are deposited, sparingly at first and in detached masses, but accumulating by degrees: these, too, are at length fashioned into distinct osseous structures, which, extending in every direction, until they touch at every point, ultimately form the connected bony frame-work of the system. This bony fabric, like the soft solid, tender and yielding at first, becomes by degrees firm and resisting, fitted, as it is designed, to be the mechanical support of the body, and the defence of all the vital organs.

But among all the changes induced in the body by the progress of age, none is more remarkable, or has a greater influence in diminishing the energy of the actions of the economy, and in causing the ultimate termination of all those actions in death, than the change that takes place in the minute blood-vessels. The ultimate divisions, or the smallest branches of the arteries and veins, the capillary vessels, as they are termed, are exceedingly abundant in the early periods of life, and are as active as they are numerous. The capillary arteries diminish both in number and activity from infancy to childhood, from childhood to youth, from youth to maturity, and from maturity to old age. Their coats, like other soft solids, increase in density and rigidity; their diameter contracts, many of them become completely impervious, and ultimately disappear. The diameter of the capillary veins, on the contrary, enlarges. The coats of the veins, originally thinner than those of the arteries, instead of thickening and contracting, seem rather to grow thinner and more dilatable; hence their fulness, their prominence, their more tortuous course, and their greater capacity. At the two extreme periods of life the quantity of blood contained in these two sets of vessels is completely inverted. In infancy, the proportion of blood contained in the capillary arteries is greater than that contained in the capillary veins; in youth, this disproportion is diminished; at the period of maturity, the quantity in one set nearly if not exactly balances that in the other; in advanced age, the preponderance is so great in the veins, that these vessels contain probably two-thirds of the entire mass. This difference in the distribution of the blood, at the different epochs of life, affords an explanation of several important phenomena connected with health and with disease. It shows, for example, why the body grows with so much rapidity at the early periods of life; why it remains stationary at the period of maturity; why it diminishes in bulk as age advances; why a plethoric state of the system affects the arteries in youth, the veins in age; why hæmorrhage, or a flow of blood, is apt to proceed in the young from the arteries, and in the aged from the veins; and so on.

In each of the epochs of life the health is peculiar; the diseases to which each is prone have also a specific character. A degree of energy in the vital actions, constituting a state of healthy vigour in one period, may be destructive violence in another; and a degree of intensity in the physical agent upon which those actions depend, merely sufficient to produce moderate excitement in one, may produce fatal stimulation in another.

AGE. *Defect of age* is in the law of all civilized countries a ground of incapacity for doing many acts and owing certain duties. By the English law, a male of the age of twelve years may take the oath of allegiance; and at fourteen, which for many purposes is considered the age of discretion, a person of either sex may choose a guardian. As to the capacity to be a witness, children under twelve are frequently permitted to give evidence, after it has been ascertained by examination that they understand the nature of an oath. The 1 Vict. c. 26, declares that no will made by any person under the age of twenty-one years is valid. A person may be appointed executor at any age, but he cannot act till he is twenty-one.

A woman may consent to marriage at twelve, and a man at fourteen years of age; though parties under the age of twenty-one years cannot marry without the consent of their respective pa-

rents or guardians. [MARRIAGE.] The age of twenty-one years is, for most civil purposes, the full age both of a man and woman, at which period they may enter into possession of their real and personal estates, may manage and dispose of them at their discretion, and make contracts and engagements. All persons under the age of twenty-one are legally called Infants. A man cannot be ordained a priest till twenty-four, nor be a bishop till thirty years of age. A man cannot be a member of the House of Commons before he has attained the age of twenty-one. In the Congress of the United States of America, a member of the Senate must not be under thirty, and to be eligible to a seat in the House of Representatives it is necessary to have attained the age of twenty-five. In the French Chamber of Peers a member may take his seat at the age of twenty-five, but he cannot vote until he has attained the age of thirty. A member of the Chamber of Deputies must not be under the age of thirty. An elector must be twenty-five years old; and before the Revolution of 1830 no one could vote who was under thirty.

With respect to crimes, the law of England regards the age of fourteen years as the age at which a person is competent to distinguish between right and wrong. Under the age of seven years a child is not punishable for an offence; but above that age, and under the age of fourteen years, if it clearly appears that a child is conscious of the nature of the crime which he commits, he may be tried and punished for it.

The 9 Geo. IV. c. 31, ss. 17, 18, makes it felony, without benefit of clergy, for a man to have carnal knowledge of a female who is under ten years of age; and the carnal knowledge of a female above ten and under twelve is made a misdemeanor punishable by imprisonment and hard labour.

The Romans made three periods of age with reference to legal capacity: 1, Infantia, or the period from birth to the completion of the seventh year; 2, from the termination of Infantia to the attainment of puberty, when persons were called Puberes; 3, from the attainment of puberty to the twenty-fifth year, during which time males were called Adolescentes, or Minores. From the attainment of the twenty-fifth year they were called Majores. An Infans could do no legal act, A person under the age of puberty could do the necessary legal acts in respect of his property with the sanction (*auctoritas*) of his tutor, who was the guardian of his property. It was somewhat unsettled what was the age at which a male attained puberty, but the best opinions fixed it at fourteen. A woman attained puberty at the age of twelve. Males who were puberes could manage their property, contract marriage, and make a will. Roman women of all ages were under some legal incapacities. Male persons between the age of puberty and twenty-five were protected to a certain extent in their dealings by a Lex Prætoria, and the rules of the Prætorian Edict, which were founded upon it. Under the Emperor Marcus Aurelius, all persons under twenty-five were required to have a Curator, whose functions and powers were somewhat similar to those of the tutor up to the age of puberty.

(Savigny, *Von dem Schutz der Minderjährigen, Zeitschrift für die Geschichtliche Rechtswissenschaft*, vol. x., and *System des Heut. Röm. Rechts*, iii. 21, &c.)

AGE OF ANIMALS. Every species of organic being has a definite duration of life, a duration determined by the laws of nature; but which cannot be known except by experience. Hence it is that a table of the natural duration of life throughout the whole of the animal kingdom, or even throughout the vertebrate classes, involves a thousand insurmountable difficulties in the way of its execution. We cannot watch the progress of animals from their birth to their death in a state of nature; we cannot wander in the depths of ocean, and study in their native haunts the countless thousands of living things that tenant the briny waters. But setting all this aside, so many are the chances of life, so few are the animals, even within the range of our observation, which die from age alone, that the natural duration of life, even of those which man has domesticated, is not in all cases to be precisely ascertained. Our data cannot be safely taken from single instances; a collection of examples is requisite; to carry out the requisite researches through the mammalia alone, involves the labour of years, and will lead at last only to general deductions. Something may be learned from the extensive Vivaria now established in so many parts of Europe, but unfortunately animals in confinement seldom reach maturity; for from the privation of liberty, the restriction of their bodily exercise, the unnatural food upon which they often subsist, from an impure atmosphere and an uncongenial climate, even should acute diseases not sweep them off, their enfeebled constitutions sink by slow decay, and prematurely yield to death. Hitherto then the little knowledge which we possess respecting the natural duration of the life of animals appears to be more the result of casual opportunities than of systematic observation.

It is generally considered as a rule, that the sooner an animal arrives at maturity, the sooner is its existence terminated; and without doubt a certain degree of truth attaches to this opinion, more especially on a broad comparison of the vertebrate classes among each other. A question however here opens:—What are we to understand by maturity? The maturity of mammalia supposes the completion of growth and the power of reproduction; so also of birds: but this does not apply to reptiles and fishes; for these reproduce their species long before the period at which their growth is stationary. The term maturity, therefore, in the sense in which we apply it to mammalia and birds, is not appropriate to these. Indeed among the cold-blooded vertebrata, whose circulation is languid, whose natural heat is not much above that of the medium in which they live, and whose tenacity of life is proverbial, the natural duration of their existence might be supposed to be considerable. Tortoises and turtles drag on through a life of ages, and the same observation applies to crocodiles and huge snakes,

such as boas and pythons. With respect to fishes, whose growth is slow, and whose skeleton never attains to the consistency which characterizes the bones of mammalia and birds, and which in some, as the ray, skates, sharks, &c., remains permanently cartilaginous, their existence seems to be remarkably enduring; they inhabit a medium much less liable to sudden alterations of temperature than is the atmosphere, and their muscular powers are very great. The pike has been known to live 267 years, and the carp 200, without ending their existence, even then, according to the course of nature. It is probable that the oceanic fishes enjoy a still longer term of life than the freshwater species, but no data exist upon which to draw out a *limited scale*. Fishes devour each other in turn, and few die a natural death, except perhaps the largest and most ferocious, who have survived the general conflict, in which, while they were yet small, they took their chance.

Birds vary greatly as to their term of life; the eagle, the vulture, the raven, the swan, the parrot, the goose, and some others, live to a great age; but among the smaller birds ten, fifteen, or at the most twenty years are the extent of their existence; the caged canary-bird will live from ten to fifteen years.

With regard to the mammalia, it is not easy to extend general rules to any thing like universal application. The most prolific are generally the shortest lived; this we see exemplified more particularly in the Rodentia, which are, as a rule, extremely prolific, and of which the existence, on the average, is of short duration. Yet, notwithstanding their short existence, so rapidly do they multiply, that were their numbers not thinned, according to the appointment of nature, by numerous predatory enemies, they would desolate the most fertile regions of the earth, and perish in a famine of their own creation.

On the other hand, as might be anticipated, the larger mammalia, and more especially those which produce a single offspring in the course of every two years, enjoy an extended duration of existence. Such at least is the case to a certain extent. The age of the elephant, the rhinoceros, and hippopotamus, is said to extend through centuries, yet the horse is in extreme age at 30, and so is the ox; the sheep, it is said, will live for about 15 years; but none of these large herbivora produce throughout the whole of their lives as many offspring as the rabbit does in one summer.

The hog, however, unlike the pachydermata generally, is very prolific, and yet very long lived. Among the carnivora there is great variation as regards the longevity of species. The cat and dog live from 15 to 20 years. The lion, which is scarcely mature till five years old, may live for 50 or 60 years, and perhaps longer. The bear is said to attain to a great age, but our data are all uncertain.

Of the duration of the existence of the cetaceous mammalia no estimate can be taken. Who has numbered the years of the whale?—who has watched the cub from its birth to its gigantic maturity, and through its phases of vigour and of slow decay? Hundreds of years probably pass till it yields to its appointed doom.

To determine the exact age of animals is often a matter of importance; we mean the number of months or years which they have numbered at a given time. The characters of the dentition in mammalia will at once enable us to determine whether a quadruped is immature, mature, or aged,—and in some cases, as the ox, and the males of the red and fallow deer, the horns will assist us in our diagnosis; the increase of the rings at the base of those of the former, and that of the number of snags and branches in the antlers of the latter, being good indicia. In the females of the deer tribe these tests fail, because they have no antlers. Up to a certain age the teeth of the horse (if not unfairly treated) will indicate its age; and in horned cattle and sheep the incisors may be studied as indicia in this respect. Yet our domestic animals, as it is among ourselves, bear their age very differently—the toil-worn labourer is aged at forty, while another man at sixty or sixty-five is in vigour, and appears younger than the labourer of forty years only. We have seen horses old to all intents and purposes at seven or eight, and others hale and hearty at an advanced period; their age, as Adam in 'As you like it' says, 'is as a lusty winter, frosty but kindly.'

But leaving our domestic animals, which being familiar to us are not utterly destitute of signs rather to be felt than detailed, by which their age is indicated, we may at once admit that among other mammalia, birds, fishes, and reptiles, we have no definite tests of their age, those merely which indicate immaturity or advanced age excepted, and not always so; for there is reason to believe that in many of the cold-blooded vertebrata growth is not uniformly progressive, but, from some cause or other, sometimes stationary, sometimes accelerated.

AGE OF LIFE. [MORTALITY.]

AGE OF TREES. Every thing connected with the growth of timber-trees, their duration, and the causes which conduce to their decay, bears so directly upon points not only of general interest, but of great practical importance, that we have thought it advisable to devote an article to its separate consideration.

Plants, like animals, are subject to the laws of mortality, and, in many cases, have the period of their existence determined by nature with as much exactness as that of an insect. But at the same time, not only their structure, but their vital actions are so peculiar, that little analogy can, in any case, be traced between the more perfect of them and the animal world; and a very large proportion appear to be capable of an almost indefinite period of existence, if it were not for accidents and disease, independent of old age.

It is chiefly to annual and biennial plants that what may be called a precise period of duration is fixed; a period determined by the production of their fruit, and not capable of being prolonged beyond that event, except by artificial means. Dismissing all such from our consideration, the remainder of the more perfect part of the vegetable kingdom, whether herbaceous, or shrubby,

or arborescent, consist of plants which may be classed under two principal modes of growth.

One of these modes is to increase, when young, in diameter, rather than in length, until a certain magnitude is obtained, and then to shoot up a stem, the diameter of which is never materially altered. The addition of new matter to a trunk of this kind takes place by the insinuation of longitudinal fibres into the *inside* of the wood near the centre; on which account such trees are called *Endogenous* [ENDOGENS]: they also bear the name of *Monocotyledons*.

The other mode is, from the beginning, to increase simultaneously in length and diameter, but principally in length. The addition of new matter to a trunk of this kind, takes place by the insinuation of longitudinal fibres into a space beneath the bark, and on the *outside* of the wood near the circumference; on which account such trees are called *Exogenous* [EXOGENS]: they also bear the name of *Dicotyledons*.

To the first of these classes belong the palm tribe and some other tropical trees. There is scarcely any well-attested evidence of these plants ever acquiring any considerable age. It has indeed been supposed, that certain Brazilian cocoa-nut palms may be from 600 to 700 years old, and that others probably attain to the age of something more than 300 years. But the method of computing the age of palms, which is either by the number of rings externally visible upon their rind between the base and the summit of the stem, or by comparing the oldest specimens, the age of which is unknown, with young trees of a known age, is entirely conjectural, and not founded upon sound physiological considerations; besides which, the date-palm, which is best known to Europeans, does not at all justify the opinion that palms attain a great age; the Arabs do not assign it a greater longevity than from two to three centuries.

But in exogenous trees, it is quite the reverse: to their existence no limited duration can be assigned. Of the many remarkable cases upon record of a great age attained by exogenous trees, the following are among the more interesting.

At Ellerslie, the birth-place of Wallace, three miles to the S. W. of Paisley, stands an oak, in the branches of which tradition relates that celebrated chieftain to have concealed himself with three hundred of his followers. However improbable the latter circumstance may be, it is at least certain that the tree may well have been a remarkable object, even at the period assigned to it by tradition, namely, in the beginning of the fourteenth century, and if so, this individual must be at least 700 years old. Its branches are said to have once covered a Scotch acre of ground; but its historical interest has rendered it a prey to the curiosity of the stranger, and the limbs have gradually disappeared till little remains except the trunk.

Many other cases of oaks of extreme old age are recorded, some of which have been estimated at 1500 or 1600 years.

Of ancient yews several authentic instances can be named. At Ankerwyke House, near

The Wallace Oak.

Staines, is a yew older than the meeting of the English barons at Runnymede, when they compelled King John to grant the Magna Charta.

The Ankerwyke Yew.

This tree, at 3 feet from the ground, measures 9 feet 3 inches in diameter; and its branches overshadow a circle of 207 feet in circumference. The yews of Fountains' Abbey, in Yorkshire, are probably more than 1200 years old, and to others an age of from 2500 to 3000 years has been assigned.

Even this degree of antiquity is, however, much less than that of the baobab trees of Africa, estimated by Adanson at 5000 years; and the deciduous cypress of Chapultepec in Mexico, which the younger De Candolle considers still older.

The way in which the age of some of these specimens has been computed is twofold: firstly, by comparing them with other old specimens, the rate of growth of which is known; and secondly, by cutting out a portion of their circumference, and counting the number of concentric rings that are visible; for in exogenous trees the woody

cylinder of one year is divided from the succeeding one by a denser substance, which marks distinctly the line of separation of the two years.

The first of these methods is sufficiently correct to give at least an approximation to the truth, and the latter would be absolutely correct, if one could be quite sure that observers provided against all possible causes of error. But it has been shown (Dr. Lindley's 'Introduction to Botany,' p. 66), that in consequence of the extreme inequality in thickness of the annual layers of wood on opposite sides of a stem, a person who judged of the whole age of a tree by the examination of the layers of the stunted side only, would commit errors to the amount of sixty per cent. and more. It is by no means impossible that the great age assigned to the deciduous cypress and the baobab may be connected with an error of this nature.

AGES OF THE WORLD. In the mythology of the Greek and Roman poets the history of the world was divided into four ages, the golden, the silver, the brazen, and the iron; as, for instance, by Hesiod in his poem entitled 'Works and Days,' and by Ovid, in his 'Metamorphoses' (book i.). The golden age, when Saturn reigned, is represented as having been that of perfect innocence and happiness; from which the others have gradually degenerated—the iron age, or that which now subsists, being the most wicked and miserable of all. Sometimes these ages are spoken of as merely so many successive periods in the history of Italy. Saturn having been driven out of heaven by his son Jupiter, is supposed to have sought an asylum in that country, where, in return for the protection he received from King Janus, he taught him and his people agriculture, and the other arts of cultivated life. According to this latter mode of telling the story, the golden age is represented as consisting in the triumph of civilization over previous barbarism; whereas the other version seems intended to indicate that the primeval state of man was that in which he enjoyed the greatest felicity. The two statements, therefore, may be taken as expressing two opposite theories or opinions which have divided speculators upon this subject even to our own day. The disagreement among the fabulists, however, is only with regard to the original condition of man; it seems to have been admitted on both sides that a gradual declension both of the happiness and virtue of the world has been going on ever since the age of gold.

AGEN. [Lot et Garonne.]

AGENEIO'SES, a genus of abdominal Malacopterygious fishes, separated from the silures by Lacépède, and containing two species, both from the freshwater lakes and rivers of Surinam.

AGENT (*from the French Agent, and that from the Latin Agens*). An agent is a person authorized by another to do acts for him and in his name; and the person who authorizes him is called the principal.

An agent cannot be appointed to bind his principal by deed otherwise than by deed; nor can an agent be appointed by a corporation aggregate (unless for certain ordinary and inferior purposes) otherwise than by deed: and for the purpose of making leases and other acts specified in the first, second, and third sections of the Statute of Frauds, the authority of the agent must be in writing. In all other cases no particular form is necessary; a verbal appointment is sufficient; and the mere fact of one person's being employed to do any business for another creates between the parties the relation of principal and agent.

An agent's authority (unless it is an authority joined with an interest, such as a power of attorney granted as a security for a debt) may, in general, be revoked by the principal at any time. It also ceases upon his death or bankruptcy.

There are many kinds of agents, such as bailiffs, factors, brokers, &c. This article contains the general principles of law, which are applicable to all.

The general rule is, that a man may make any contract by an agent which he can make himself, and do any act with respect to his own property by an agent which he may do himself. Any person may be an agent who would be competent to do the act for himself.

When an agent's authority is limited, he must adhere strictly to his instructions. If instructed to sell, he must not barter; nor if instructed to sell at a certain price, is he authorized to take less.

When the agent's authority is not precisely determined, he must act for his principal like a prudent man in the management of his own business.

If he is authorized to sell, and no price is limited by his instructions, he must endeavour to obtain the best price for the goods. If there have been other transactions of the same nature between the parties, it is presumed that the principal intends that the same mode of dealing should be pursued, which in former cases he had prescribed or approved.

In mercantile transactions, when the agent has no particular instructions, he should follow the common usage of the business in which he is employed; and he will be justified in doing so, even though, under the particular circumstances, he might have acted otherwise to the advantage of his principal.

The general authority to act as agent includes all necessary or usual means of executing it. An agent is, therefore, authorized to do all such subordinate acts as are either requisite by law, in order to the due performance of the principal object of the instructions, or are necessary to effect it in the best and most convenient manner, or are usually incidental to it in the ordinary course of business.

If an agent does an act which is not warranted by his authority, either express or implied, or if he does an act within his authority, but with such gross negligence or unskilfulness that no benefit can accrue from it, the principal may reject what he has done, if he rejects it as soon as he is informed, and gives notice to his agent within a reasonable time. If an agent puts out his em-

ployer's money at interest without his authority, or if a factor, employed to purchase, deviates from his instructions in price, quality, or kind, the principal may disavow the transaction.

If the principal does not either expressly or impliedly adopt the agent's act, the hazard of it lies with the agent, even though he did it in good faith, and for the interest of his employer. Any profit that may accrue from it he must account for to his principal; and if loss ensues, he is bound to make it good to him. An agent is likewise answerable to his principal for all damage occasioned by his negligence or unskilfulness. His responsibility extends to the whole amount of the damage suffered by the principal, either by damage done to his own property, or by his being obliged to make reparation to others.

An agent must keep a regular account of his dealings on behalf of his principal; communicate the results from time to time; and account honestly when called upon.

An agent is not in general accountable for money until he has actually received it, unless he has by improper credit, or by other misconduct, occasioned a delay of payment. But an agent acting under a commission *Del credere*, that is, one who has undertaken to be surety to his principal for the solvency of the persons whom he deals with, is in their default accountable for the debt. If an agent has received money on behalf of his principal, he is bound to take care of it; and if any loss is occasioned by the fraud or failure of third persons, he will, unless his conduct be warranted by his instructions, or the usage of trade, be bound to make it good.

The agent must account for any interest which has been made upon the balance in his hands; and for all profit which he may have derived by dealing or speculating with the effects of his principal.

It is the duty of an agent to apprize his principal, with all convenient expedition, of all material acts done or contracts concluded by him.

We now consider what are the duties of the principal to his agent; or what are the rights of an agent against his principal.

An agent is entitled to his commission; that is, a remuneration in return for his services. The amount of commission is sometimes determined by agreement; sometimes it is regulated by the usage of trade; and in some few cases, as of brokerage for the procuring of loans, &c., the amount of commission is limited by act of parliament.

An agent may forfeit his right to commission by misconduct: as, if he keeps no account; if he makes himself an adverse party to his principal; or if, in consequence of his negligence or unskilfulness, no benefit accrues to the principal from the services performed.

An agent is also entitled to be reimbursed all such advances made on behalf of his principal as are justified by his authority, whether expressed or implied, or subsequently sanctioned by his principal. And cases may sometimes occur of urgent danger, when there are no means of referring for instructions, in which an agent is justified in making advances without particular directions. If, on account of the lateness of the season, or other good cause, he insures the cargo without orders, he is entitled to charge his principal with the premium, and in such a case the assent of the principal would be inferred from very slight circumstances.

An agent has a lien upon the property of his principal; that is, a right to retain possession of it till his demand is satisfied. Lien is either particular or general. A particular lien is a right to retain the thing itself in respect of which the claim arises. This right is possessed by bailees in general, and consequently by all agents in the nature of bailees.

General lien is a right to retain any property of the principal which may come into the agent's possession in the regular course of business. This, being an extension of the general right, exists where it is created by contract, by the previous dealings of the parties, or by the usage of trade. Factors, packers, where they are in the nature of factors, insurance-brokers, and bankers, have, by usage, a general lien in their respective employments.

This right may in general be exercised in respect of any claim to commission or reimbursement which the agent may have acquired in the due execution of his authority; but it does not extend to demands arising from transactions not within his course of dealing as such agent.

There can be no lien unless the agent gets possession of the goods. A consignee, for instance, can have no lien on goods consigned to him, if the consignor stops them before they come into his hands; nor has he a lien on property which has been casually left in his office, which has been deposited with him as a pledge for a specific sum, or which he has obtained possession of by fraud. If an agent parts with the possession of the property, the lien is in general lost: but by statute 4 Geo. IV. c. 83, amended by 6 Geo. IV. c. 94 (the factor's acts), if a factor pledges the goods or commercial documents of his principal as a security for advances made, with notice that they are not his own; or if, without such notice, he pledges them for a pre-existing debt due from himself, the lien of the factor on such goods or documents is transferred to the person with whom they are pledged; that is, he acquires the same right which the factor, while the goods remained in his possession, could have maintained against the principal.

The right of lien may be destroyed by the agreement of the parties; and if the agent enters into a contract with his employer inconsistent with the right (as if he agrees for a particular mode of payment), he is considered to waive it.

The responsibility of a gratuitous agent (the *mandatārius* of the Roman law) is much less than that of one who is paid for his services. He will in general incur no liability, provided he acts with good faith, and exercises the same care in the business of his employer as he would in his own. He has of course no right to commission, but he is entitled to be reimbursed for any rea-

sonable payments made or charges incurred in behalf of his employer. (As to the Roman *mandatarius*, see Gaius, iii. 155—162; iv. 83, 84; 'Dig.' 17, tit. 1.)

It remains to explain the consequences of the relation of principal and agent, as between the parties and third persons: and, first, as between the principal and third persons; and, secondly, as between the *agents* and third persons.

It is a general rule that the act of the agent is to be considered as the act of the *principal*.

A bargain or agreement entered into by an agent therefore binds his principal, whether it tends to his benefit or his disadvantage; and, in order to have this effect, it is not necessary that it should be within the agent's real authority, either express or implied, provided it be within what may be called his *apparent authority*—that is, provided it is such as the person dealing with the agent might reasonably presume to be within his authority. There may be various grounds for presuming that a general agent has the authority which he appears or affects to have; but they may be reduced to this: the grounds must be such as would lead prudent persons generally to suppose that the agent had authority, though the agent is answerable to his employer for any damage that may follow from his having entered into an engagement not within his authority; yet the principal is bound to keep the engagement entered into by his agent upon a reasonable presumption of authority.

But in the case of a special agent (that is, of a person appointed merely to do certain particular acts), as no presumption of authority can arise from usage of trade, the principal will not be bound by any act not within the real authority of the agent; those who deal with the agent must ascertain what his authority is.

The agreement made by an agent, and all his dealings in connection with it, provided they are within his real or apparent authority, are binding on the principal. The representations made by an agent, at the time of entering into an agreement (if they constitute a part of such agreement, or are in any way the foundation of or inducement to it), and, in many cases, even the admissions of an agent as to anything directly within the course of his employment, will have the same effect as if such representations or admissions had been made by the principal himself. If notice of any fact is given, or if goods are delivered to an agent, it will be considered as notice or delivery to the principal. And in general, payment to an agent has the same effect as if it had been made to the principal, and in such cases the receipt of the agent is the receipt of the principal. But such payment must be warranted by the apparent authority of his agent. If money is due on a written security, as long as the security remains in the hands of an agent it is to be presumed that he is authorized to receive the money, and payment to him will therefore discharge the debt: but if the agent has not the security in his possession, the debtor will be liable, in case the agent should not account for it to his principal, to pay it over again.

If the principal gives notice to the buyer not to pay the money to the factor with whom he made the bargain, he will in general not be justified in doing so; but if the factor had a lien upon the goods for his general balance, he has a right to require the buyer to pay him instead of his principal; and such payment to the factor, notwithstanding any notice given by the principal, will be a discharge of the debt.

A principal is in general liable for all damage occasioned to third persons by the negligence or unskilfulness of his agent, when he acts within the scope of his employment; and for any misconduct or fraud committed by him, if it be either at his express command or within the limits of his implied authority.

From this liability, however, persons are exempted who, though they appear in some degree in the character of principals, yet have no power in the appointment of those who act under them. Thus the postmasters-general, and persons at the head of other public offices, have been held not to be liable for the conduct of their inferior officers. The owners and masters of vessels are also by statute released from liability to third persons from the negligence or unskilfulness of the pilots by whom the vessels are navigated into port.

It remains to state what are the effects of the relation of principal and agent, as between the agent and third persons.

An agent is not in general personally responsible on any contract entered into by him on behalf of his principal: but there are several exceptions to this rule.

If an agent has so far exceeded his authority that his principal is not bound by his act, the agent is liable.

An agent is also liable when the contract was made with him not as agent. If in any contract made on behalf of his principal, the agent binds himself, or if the circumstances of the transaction are such that the credit was originally given to him and not to the principal (whether such principal were known at the time or not), the agent will be liable, in the first instance, to the persons with whom he has dealt.

When an agent acts in his own name, and gives no notice of his being employed in behalf of another person, he is to be considered as the principal, and the persons who have dealt with him have the same rights against him as if he actually were so. In an action by the principal on demand arising from such transactions, they may set off a debt due from the agent himself; which they could not have done, if they had known that he acted only as an agent. And if he afterwards discloses his principal, he is not discharged from his liability; those with whom he has dealt may either sue him on his personal contract, or the principal upon the contract of his agent.

An agent is responsible to third persons for any wrongful acts, whether done by the authority of his principal or not; and in most instances the person injured may seek compensation either from the principal or the agent.

An agent cannot delegate his authority to another, but he may employ other persons under him to

perform his engagements, and the original agent is responsible to his principal as well for the conduct of such sub-agents as for his own: but with respect to damage sustained by third persons from the wrongful acts of sub-agents, the damages must be recovered either from the person who did the injury, or from the principal. The original agent is responsible to third persons only for his own acts, and such as are done by his command.

If an agent who is intrusted with money or valuable security, with written directions to apply the same in any particular manner, converts it to his own use; or if an agent who is intrusted with any chattel, valuable security, or power of attorney for the transfer of stock, either for safe custody or for any special purpose, without authority sells or pledges, or in any manner converts the same to his own use, he is guilty of a misdemeanor punishable with fourteen years' transportation, or to fine and imprisonment at the discretion of the court. But this does not prevent his disposing of so much of any securities or effects on which he has a lien or demand, as may be requisite for the satisfaction thereof. It is also a misdemeanor, punishable in the same manner, if a factor or agent employed to sell, and intrusted with the goods, or the documents relating to them, pledges either the one or the other, as a security for any money borrowed or intended to be borrowed, provided such sum of money is greater than the amount which was at the time due to the agent from the principal, together with any acceptances of the agent on behalf of his principal. (7 & 8 Geo. IV. c. 29, s. 49, &c.)

The 5 & 6 Vict. c. 39, entitled 'An Act to amend the law relating to advances bonâ fide made to agents entrusted with goods,' facilitates the practice of making advances on the security of goods or documents to persons who are known to have possession of them as agents. Any agent who is in the possession of goods, or of the documents of title to them, is to be held in law as the owner, to the effect of giving 'validity to any contract or agreement by way of pledge, lien, or security bonâ fide made by any person with such agent.' The agent may receive back goods or documents which have been pledged for an advance, and may replace them with others; but the lender's lien is not to extend beyond the value at the time of the original deposit. The documents which are held to authorize the agent in disposing of property represented by them, and the transference of which is a sufficient security to the lender, are—'any bill of lading, India warrant, dock-warrant, warehouse-keeper's certificate, warrant or order for the delivery of goods, or any other document used in the ordinary course of business as proof of the possession or control of goods, or authorizing or purporting to authorize, either by indorsement or delivery, the possessor of such document to transfer or receive goods thereby represented.' Any agent who is in possession of such documents in the mode in which the act mentions, is considered to be in possession of the goods, and all pledges of such documents are pledges of the goods. An advance of money on the delivery of the goods or documents, pursuant to a written agreement to make such delivery, is valid, although the delivery of the goods or documents do not take place till after the advance. A contract by the agent's clerk, or any person acting for him, is binding. An agent who, contrary to his instructions and for his own benefit, grants a fraudulent security, is liable to transportation, or such other punishment by fine or imprisonment, or both, as the court may award. There are provisions in the act for enabling the owner to redeem his goods while they remain unsold, on satisfying the person who holds them as a security; and for protecting the principal in the case of the agent's bankruptcy.

AGESILA'US I. was the sixth king of the Agid line of Sparta, if we do not include Aristodēmus.

AGESILAUS II., younger son of Archidāmus, king of Sparta, succeeded his half-brother, Agis II., B.C. 398, when he was about forty years of age.

In the first year of his reign a plot was formed to effect a change of government. The political constitution, established by Lycurgus, had degenerated into an oligarchy. Almost all political power, with the exclusive right to hold high civil and military office, was engrossed by those families who boasted to be of pure Spartan blood, the term Spartan being opposed to Lacedæmonian. This Spartan caste is supposed to have consisted of the unmixed descendants of the original Dorian conquerors: the Lacedæmonians are conjectured to have been the progeny of enfranchised Helots, strangers associated into the citizenship, and a remnant of the Achæi. In the time of Agesilaus the number of Spartans had so dwindled that they could not be spared for foreign service in any rank below that of commanders. The ephori, and all the leading officers of administration, civil and military, were taken from this privileged caste. The object of Cinadon's conspiracy was to extend the right of holding these high offices to all citizens. The plot was discovered before it was ripe; Cinadon, the author and ringleader, was executed, and the Spartans held fast their power.

In B.C. 396 Agesilaus was sent to command against the Persians in Asia. His first object was to conciliate the Asiatic cities by prudent management and liberality; and he succeeded in reconciling their factions. A war broke out in Greece, after he had been about two years in Asia, during which he had defeated two Persian generals.

The intrigues of the Persians and the hatred of the Spartan influence had occasioned a dangerous league to be formed against Sparta. (Xenophon, 'Hellenic.' iii. 5.) Thebes, Argos, and Corinth declared against the Lacedæmonians, and Athens followed the example. The ephori ordered Agesilaus home, and on his route he met his enemies near Coronēia in Bœotia, where a fierce battle took place (August, B.C. 394), in which the Spartans obtained only a doubtful victory. The probability of Athens recovering her former power after her walls were rebuilt (B.C. 392), induced the Spartans to send Antalcidas (B.C. 387) with

proposals to Persia, favourable to themselves, but disadvantageous to the rest of Greece. The bearer of these offers was the personal enemy of Agesilaus. The Persians dictated the treaty in the language of conquerors. (Xenophon, 'Hellen.' V., i. 31.) All the Grecian cities of Asia were to be subject to the king of Persia: all the rest to be independent: the king was to keep possession of Cyprus and Clazómenæ; and the islands of Lemnos, Imbros, and Scyros, were given to the Athenians, to whom they formerly belonged. Artaxerxes concluded with denouncing war against those who should not submit to his terms. Sparta had now, though not worthily, recovered her power in Greece. Phœbidas, one of her generals, on his march into Thrace against Olynthus, was encamped in the neighbourhood of Thebes, at a time when Ismenias and Leontiades, the heads of opposite factions, exercised the chief magistracy together. Leontiades, who courted the friendship of Sparta, secretly introduced Phœbidas and his troops into the Cadmeia, the citadel of Thebes (B.C. 382). Ismenias was apprehended, and 400 of his friends immediately fled to Athens. Complaint was made at Sparta of this treacherous aggression in time of peace. Agesilaus was, in general, more just and liberal than the rest of his countrymen; but he contended that it was necessary to examine whether the possession of the Cadmeia was of advantage to Sparta, to which every other consideration must give way. The decree of the Spartans was in their own favour. The assembly, however, resolved to keep the citadel, and to bring Ismenias to trial. But a counter-revolution was soon effected; and the Spartans were compelled to evacuate the citadel.

Agesilaus excused himself from the command of the army sent to reduce the Theban revolutionists, on the plea of age. His colleague, Cleombrotus, was appointed in his stead. The events which occurred during the absence of Agesilaus form no part of the present subject. On returning home Cleombrotus left Sphodrias at Thespiæ, in command of part of his army, who misconducted himself, and caused the Athenians to conclude an alliance with Thebes against Sparta. Agesilaus then resumed the command, and held it through two successive campaigns, till obliged to resign through failing health.

In the battle of Leuctra (B.C. 371), the Lacedemonians under Cleombrotus were overcome by inferior numbers of Thebans. On this occasion, a number of the soldiers having fled, Agesilaus was allowed to suspend the law which visited cowardice with disgraceful punishment. He prudently announced that it might sleep for one day, and then resume its power.

The Theban army increased daily by the defection of the allies of Sparta: it penetrated into Laconica, and laid waste the whole country, B.C. 369. The city, however, was saved by the prudence of Agesilaus, who shut himself up in Sparta, and avoided an engagement. Epaminondas, the Theban commander, did not venture to assault the city; and at last, his allies growing weary of the service, the winter approaching, and relief coming to Sparta from Athens, the Theban general retreated.

After the death of Epaminondas, at the battle of Mantineia (B.C. 362), in which Agesilaus probably commanded the Spartans, the weariness of all parties produced a cessation of hostilities. Agesilaus was now above eighty years old, but he had still vigour enough left to lead an army into Egypt. According to Plutarch, Agesilaus went expressly to help Tachos against his master, King Artaxerxes II.; but a rival to Tachos starting up in the person of Nectánebos, another Egyptian, Agesilaus changed sides. After establishing Nectanebos in the government of Egypt, the old king set out on his voyage homewards, loaded with money and presents. Being driven by contrary winds on the coast of Africa, he died there at the age of eighty-four. His attendants preserved the body in melted wax, and took it to Sparta to be buried.

The character of Agesilaus is exalted by Xenophon far above its merits. The historian was on terms of personal intimacy with the Spartan king, and was besides no great admirer of the constitutional forms of Athens, his native city, which he loved to contrast disadvantageously with those of Sparta.

(Plutarch's *Life of Agesilaus;* Xenophon's *Hellenica,* and *Panegyric on Agesilaus;* Pausanias, iii. 9.)

AGGERSHUUS, better known as CHRISTIANIA, one of the divisions of the kingdom of Norway.

AGGERZEEN, the name of a large antelope, mentioned by Pearce in his Account of his Residence in Abyssinia. It is, perhaps, identical with the Agayer of Salt (Appendix to Second Journey). We have no information enabling us to decide the species.

AGHRIM, or AUGHRIM, a village in the county of Galway, in Ireland, famous for the victory obtained in its neighbourhood, July 12, 1691, by the forces of King William, commanded by General Ginkell, over those of King James, commanded by General St. Ruth. The latter were 25,000 strong, and very advantageously posted; the former amounted only to 18,000, and had to march to the attack through a bog, in which they sunk up to the middle. The result was in a great measure owing to the death of General St. Ruth by a cannon ball in the early part of the action, and the officer who took the command having, through a jealousy which subsisted between them, been left in ignorance of the dispositions of his superiors. The victors followed up their success with a terrible slaughter of the defeated and flying enemy: no fewer than 7000 are said to have been destroyed. Only 450 prisoners were taken. The loss of the English did not exceed 700 killed, and 1000 wounded. This victory was followed by the complete submission of Ireland. In Archdall's 'Monasticon Hibernicum' it is stated, that there was formerly here a priory of canons regular of St. Augustine, which was said to have been founded in the 13th century. Aghrim is in the barony of Kilconnell, and is situated 28 miles east from the town of Galway, and 75 west from Dublin. The village is now much decayed.

AGINCOURT, or AZINCOUR, a village in the department of Pas de Calais, France, in the

ancient province of Artois, celebrated for a great victory obtained by the English under Henry V., over a French army vastly superior in numbers. The English king, in 1415, conveyed over to Normandy (the hereditary possession at one time of his ancestors) a considerable army, and having reduced the town of Harfleur near Hâvre, set out for Calais. The siege of Harfleur occupied thirty-six days; and the loss sustained by the English, principally by sickness, during this period, was immense. Upon reaching Abbeville and Amiens, Henry found the passes of the Somme guarded, and the bridges broken down; but, having erected a temporary bridge, at a place called Nesle, he passed his army over, and, pursuing his route, came to an engagement with his opponents on the 25th of October. The disparity of forces was very great. No ancient English writers make the number of Henry's forces more than 10,000. The accounts of the number on the other side vary from 50,000 to 150,000. The descriptions of this great battle present many remarkable circumstances, some of which, founded upon the chroniclers, are familiar to every reader of Shakspere.

The loss of the respective armies is variously stated: that of the French was probably 10,000, including the Constable, three Dukes, five Counts, and ninety Barons. The victors lost probably 1200, including the Duke of York, the Earl of Suffolk, and one or two other persons of rank. Henry continued his march to Calais, which he reached on the 29th, and from thence proceeded to Dover and London, which he entered, with great pomp, on the 23rd of November.

(Nicolas's *History of the Battle of Agincourt*, 1827.)

AGIO, a term used sometimes to express the variations from fixed pars or rates of exchange, but more generally to indicate by per centages the differences in the valuations of moneys. The Italian word *aggio* is explained to mean 'an exchange of money for some consideration.' Thus, if a coin is reduced in weight, and the real value is not equal to the nominal value, the difference is the agio.

Where it is in the power of the state to prevent the degradation of the coin below the standard, no calculations of agio, strictly so called, are rendered necessary. In some states, the currency is made up of the deteriorated coins of the neighbouring countries with which the inhabitants have dealings. Under these circumstances, banks were, at different times, established by the governments of Venice, Hamburg, Genoa, Amsterdam, &c., which, under the guarantee of the state, should be at all times bound to receive deposits and to make payments, according to some standard value. The money or obligations of these banks bears a premium equivalent to the deterioration, and this premium is called the agio of the bank.

As the current coins of every country have a kind of medium value at which they are generally taken, the term agio is also applied to express what must be paid over and above this medium value. The kinds of money on which in the case of exchange an agio is paid, are not always the more valuable intrinsically, but those which are most in request.

The term agio is also used to signify the rate of premium which is given, when a person having a claim which he can legally demand in only one metal, chooses to be paid in another. Thus, in France, silver is the only legal standard, and payments can be demanded only in silver coin, a circumstance which is found to be so practically inconvenient, that the receiver will frequently pay a small premium in order to obtain gold coin, which is more easily transportable: this premium is called the agio on gold.

AGIS I., king of Sparta, was the son of Eurýsthenes, and grandson of Aristodémus, to whom Laconica was allotted after the Heracleid invasion. Aristodemus had two sons, Eurysthenes and Procles; and this Agis was, therefore, the second in one of the series of that double race of kings which reigned conjointly. No certain dates can be assigned to these early times. The other kings bearing this name were of the race of the Proclids. (Pausanias, iii. 2.; Clinton, *Fasti Hellen.*)

AGIS II., the son of Archidámus, reigned from B.C. 427 to 399. In the fourteenth year of the Peloponnesian war, B.C. 418, the Lacedæmonians, with a view to recover their influence in Peloponnesus, marched out with all their force under Agis. The Argeian army, against which his operations were directed, was brought to extremities, but Agis consented to a truce, and retreated. Agis was called to account; but he was finally allowed to resume the command, under the restriction of a council. But he soon made amends, by defeating the Argeians and their allies, the Athenians, in a great battle at Mantineia. (Thucydides, v.; Pausanias, iii. 8.)

Agis had twice commanded the Spartans in their invasions of Athens, B.C. 426 and 425. In B.C. 413 he again invaded Attica, when he occupied Decelcia. It seems that he remained there to the end of the Peloponnesian war, B.C. 401. Agis was succeeded by his brother Agesilaus. [AGESILAUS.]

AGIS III., the son of Archidámus III., reigned from B.C. 338 to 331. At the time of the battle of Issus (B.C. 333), Agis was communicating with the Persian naval commanders in the Ægean, to obtain supplies for the war against the Macedonians. While Alexander was engaged in his fourth campaign in Asia (B.C. 331), an action between Agis and Antípater, whom Alexander had left governor of Macedonia, took place in Peloponnesus. The Lacedæmonians had formed the siege of Megalópolis, which, however, held out till the arrival of Antipater to its relief. A bloody battle was fought, in which the Lacedæmonians were overpowered by superior numbers, and Agis, their king, fell. (Pausanias, iii. 10; Arrian, ii. 13; Diodorus, xvi. 63, &c.; xvii. 62.)

AGIS IV., son of Eudámidas II. He became king of Sparta, B.C. 244, at the age of twenty. His career is the history of an unsuccessful reformer. His object was to restore the institutions of Lycurgus, which had long been gradually altered. His colleague in the kingly office, Leóni-

das, was a man of luxurious habits, and averse to the restoration of the primitive rules. The two great features of the proposed reformation were, the renewal of the partition of the lands, and the abolition of debts. Agis also proposed to abolish the distinction between Spartans and Lacedæmonians, retaining that between the Lacedæmonians and the Periœci, or people of the smaller towns. But the Periœci were to be trained in the strict discipline of Lycurgus, and to succeed to the privileges of citizenship as vacancies occurred. In laying his proposals before the senate, Agis recommended them by the offer of contributing his own lands and money to the common stock. His mother and his kindred followed his example. But the proposal was lost only by a single vote. To rid himself of the opposition of Leonidas, Agis contrived to get him deposed; and his crown devolved on his son-in-law, Cleombrotus, who co-operated with Agis. Agesilaus, the uncle of Agis, who was much in debt, persuaded the two kings to burn all deeds, registers, and securities; but when a division of property was proposed, he devised repeated pretexts for delay. In the meantime Agis was sent with an army to join the Achæan forces under Aratus, to oppose the Ætolians; and in this command he maintained his high character for integrity and ability.

On his return Agis found the popular feeling changed, for the poor were indignant at the delay in dividing the lands. Leonidas was restored, and Agis was thrown into prison. He was condemned, and executed with indecent haste, B.C. 240. Even one of his executioners was moved to tears, but the king said, 'Lament me not; though I suffer unjustly, I am happier than my murderers.' His mother and grandmother were strangled. His reign lasted only four years. His widow was forcibly taken out of her house by Leonidas, and married, against her will, to his son, Cleómenes. [CLEOMENES.]

(Plutarch, *Life of Agis* and *Cleomenes*, and *Life of Aratus*.)

AGISTMENT. This word is taken from an old French word *gister*, 'to lie down.' The original application of the term will appear from the explanation of the legal meaning of agistment. When the owner of land depastures the cattle of another person at a certain rate per week or month upon his ground, he is said to *agist* such cattle; and this contract is so called because the stranger's cattle are permitted *agister*, that is, to lie down, or be domiciled in the land appropriated to them.

A'GLAOPHON. There were two distinguished Greek painters of this name, who were probably related. The elder Aglaophon lived about 500 B.C. and was a native of the island of Thasos, where his son Polygnótus was also born.

Two pictures of Alcibiades mentioned by Athenæus must have been by the younger.

AGNA'NO, a remarkable lake near Naples, not far from the road leading to Pozzuóli and Baiæ, situated in a volcanic district, and entirely surrounded by hills rising in the form of an amphitheatre. It is about two miles in circumference. The banks of Agnano present a striking scene of solitude; hardly any habitation is to be seen on the slope of the hills; the country is very unwholesome in summer; and the malaria is increased by the practice of the country people steeping large quantities of flax in the water of the lake. Near the banks of the lake are the natural vapour-baths of San Germano, which are beneficial in cases of rheumatism and gout. On the opposite side is the famous *Grotta del Cane*, whence a mephitic vapour issues, which has the power of depriving a dog or other animal of all sensation in a few minutes. There is no mention in the ancient writers, either of Agnano or of the Grotta, but Pliny the Elder says in his 'Natural History,' that in the country about Púteoli there were vents in the ground from which deadly vapours arose: Traces of ruins of mosaic pavements, and stoves for baths, are found scattered in the neighbourhood.

AGNE'SI, MARI'A GAETA'NA, was born at Milan in 1718. When very young she distinguished herself by the acquisition of various languages; she is said to have understood Latin, Greek, Hebrew, French, German, and Spanish. She then turned her attention to mathematics and philosophy, and at the age of 19 wrote in defence of 191 theses which were published in 1738, under the title of 'Propositiones Philosophicæ.' In 1748, she published her celebrated work, 'Instituzioni Analitiche ad Uso della Gioventù Italiana,' in two volumes 4to. The first volume contains the elements of Algebra, with the application of Algebra to Geometry; the second contains an excellent treatise on the Differential and Integral Calculus. In 1750, her father, who was then a professor of the university of Bologna, being ill, she obtained permission from the Pope Benedict XIV. to supply his place. She finally retired into a convent, and died in January, 1799, aged 81. The 'Analytical Institutions' were translated into English, and published at the expense of Baron Masères, in 1801.

A'GNOLO, BACCIO D', a wood-engraver and architect, was born at Florence in 1460. He had already acquired considerable reputation as a wood engraver at Florence, when he was attracted to the study of architecture, and went to Rome to pursue it among the remains of antiquity there.

On settling himself as an architect in Florence, Baccio was engaged in several works of importance there, and acquired notoriety of a disagreeable nature, through deviations from the ordinary practice of the time.

He died in 1543, being eighty-three years of age, and left a son, Giuliano, an engraver and architect, who succeeded to the direction of his works. The most esteemed of Baccio's productions are the villa Borghesini, near Florence, and the campanile, or bell-tower, of the church of Santo Spirito (a production of Brunelleschi's), in Florence.

AGNO'STUS, the remarkable fossil genus of Crustacea usually found with Asaphus Buchii and other trilobites in the lower Palæozoic strata. (Brongniart.) Called Battus by Dalman. It abounds near Llandeilo and Christiania.

AGNOTHE'RIUM, a fossil genus of Mammalia. (Knup.)

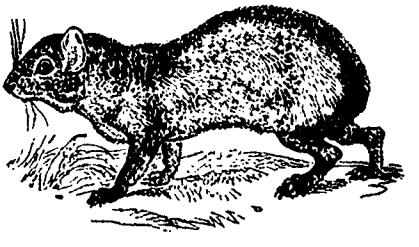
A'GONUS, a genus of Acanthopterygious fishes, instituted by Bloch, of which one species, the Pogge (*A. Europæus*), inhabits our own coast, and those of the adjacent parts of the continent. This genus is synonymous with Aspidóphorus, Lacépède. (Cuvier's *Règne Anim.*, vol. ii. p. 163; and Yarrell's *British Fishes.*)

AGOSTA, or AUGUSTA, a sea-port town on the south-east coast of Sicily, in the Val di Noto. The town was built in the 13th century, by the Emperor Frederick II., on a low peninsula, connected with Sicily by a long narrow causeway. The harbour formed by this projection is one of the safest and most sheltered in the island of Sicily. This town suffered from an earthquake in the year 1693, by which it was nearly reduced to ruins. The place is slightly fortified on the land side, and protected towards the sea by three forts. Agosta has never recovered the degree of importance which it enjoyed previous to the earthquake. The trade of Agosta is in wine, flax, olive-oil, salt, and sardines. The remarkable caves of Timpa are in its vicinity. The town is situated 18 miles N. from Syracuse, in 37° 8′ N. lat. and 15° 8′ E. long. Population about 10,000.

AGOUTI (*Dasyprocta*, Illiger; *Chloromys*, F. Cuvier), a genus of quadrupeds belonging to the order Rodentia, differing in many essential details, both from the pacas (*Cœlogenus*) and the cavies (*Cavia*, *Dolichotis*, &c.). The agoutis are natives of the warmer parts of America and the West India Islands. They are found in Brazil, Paraguay, Guiana, the Antilles, and Bahamas, and in their favourite localities often abound in considerable numbers. The agoutis have four toes on each of the anterior limbs; of these the outermost on each side is small, and seated high, while the two middle are long, and armed with stout claws; the hind feet are divided into three toes, furnished with claws of a hook-like character, and of considerable strength. The limbs are slender, and the hinder pair considerably exceed the anterior in length. Hence the pace of these animals is rapid for a short distance, and they leap with considerable agility; they seldom, however, trust to speed for safety, but seek shelter and security in the hollow of a tree, or under a rock, and allow themselves to be captured without offering any resistance, only uttering a sharp plaintive note of alarm. The head of the agouti is large, the forehead convex, the nose swollen, the ears round, short, and nearly naked; the eyes large and black, the tail short, and often a mere tubercle. The hair is glossy, of a wiry character, and annulated in different degrees with black, yellow, or white and olive-green. The molar teeth are four on each side, above and below, all nearly of the same size, and when worn presenting winding folds of enamel on the flat crowns. In some districts the flesh of these animals is esteemed, being white and tender. The agoutis use the fore paws as hands to convey the food to the mouth, and usually sit upright on their haunches to eat; they also frequently assume the same attitude in order to look around them, when anything occurs to excite suspicion or alarm. Their food is exclusively of a vegetable nature, and consists for the most part of wild yams, potatoes, and other tuberous roots. In the islands of the different West India groups they are particularly destructive to the sugar cane, feeding on the root, of which they are very fond. Hence the planters employ every artifice for destroying them, so that at present they have become comparatively rare in the sugar islands, though on the first settlement of the Antilles and Bahamas they are said to have swarmed in multitudes, and to have constituted a principal article of food among the aborigines. They were the largest of the quadrupeds found upon these islands on their first discovery.

Though the agoutis use the fore paws in holding their food and in scraping up roots, they neither climb trees nor make burrows, but resort to the hollows of decaying timber, or logs, or to similar retreats, in order to conceal themselves and rear their young. The young are born with the eyes closed, but soon become capable of shifting for themselves.

Several species of this genus are described as the common agouti (*Dasyprocta acuti*), a native of the wooded districts of Brazil and Guiana, where it is destroyed in great numbers for the sake of its flesh. It is found also in Paraguay, and in St. Lucia, St. Domingo, and other adjacent islands. This species appears to be gregarious, associating in small troops of eighteen or twenty individuals, which make the hollow of a tree their common residence. They seldom appear abroad, except towards the dusk of evening and during the hours of night; and are abrupt, active, prompt in their movements, bounding rapidly along when disturbed to regain their hiding place. The common agouti is said to breed several times in the course of the year, producing from three to six at a birth. It is preyed upon by carnivorous quadrupeds and birds, which are ever ready to pounce upon it. In bulk the agouti equals a moderate-sized hare; its general colour is grizzled reddish-brown, tinged on the neck, chest, and under parts with yellow. On the lower part of the back the hairs are long and of a golden yellow.



Black Agouti. (From F. Cuvier.)

Among other species we may notice the black agouti (*Dasyprocta cristata*, Geoff.). This species is considerably smaller than the common, being about the size of a rabbit; it is of a nearly uniform black colour, but the hairs about the cheeks

and sides are speckled with white. The black agouti is a native of Surinam, Guiana, and Brazil.

The acouchy (*Dasyprocta acuchi*), is a small but very elegant species of this group of rodents found in Guiana, and the islands of St. Lucia and Granada. It is at once to be distinguished from the other agoutis by the possession of a slender tail, upwards of two inches in length, instead of a mere tubercle. The acouchy is very active, leaps with great address, and is lively and easily rendered familiar. Its voice is a short, sharp, plaintive cry. This species is the Olive Cavy of Pennant.

(*Proceedings of Zoological Society*, 1830, pp. 6 and 75; 1832, p. 100.)

AGRA, one of the North-Western Provinces of Hindustan, is bounded on the north by Delhi, south by Malwa, east by Oude and Allahabad, and west by Ajmeer. It lies between 25° 35′ and 28° 18′ N. lat. The chief rivers of the province are the Ganges, the Jumna, and the Chumbul, and there are some smaller streams; yet the country is ill supplied with water, and that to a considerable extent from wells. North of the Chumbul the country is for the most part flat and badly timbered, but on the other side of that river, and towards the north-western quarter of the province, the surface is somewhat hilly, and more plentifully covered with trees. The climate, during a part of the year, approaches to temperate, and in the winter months may even be pronounced cold; but during the prevalence of hot winds, to which the whole of central India is occasionally liable, the heat is insupportably great.

The soil is in general well adapted for the production of indigo, sugar, and cotton. The country between the Ganges and the Jumna, called the Doab, is the most fertile part of the province, and furnishes all these articles for export.

Some coarse cloth is manufactured, principally for home use, and fine muslins and silks were formerly made to a large extent, but these branches of industry have now much diminished by the introduction of British manufactures.

AGRA, the capital city of the province of Agra, in the North-Western Provinces of Hindustan, is situated on the western bank of the river Jumna, in 27° 12′ N. lat., 78° 6′ E. long. The city of Agra was founded by the Emperor Acbar in 1566; it was previously little more than a village. He changed the name to Acbarabad, greatly enlarged the city, and built a very large fort, surrounded with high walls, which still remains, as well as his palace overlooking the Jumna. The city continued to be the seat of the Mogul emperors till 1647, when Delhi was constituted the capital city by Shah Jehan, from which period the decline of Agra may be dated. Agra is still very large, but in a comparatively ruinous state. The population is estimated at from 50,000 to 60,000. Of the public buildings in the city, besides the palace, one of the most beautiful is the Motee Musjeed, a mosque of white marble, covered with sculptures, or rather stone-carvings, of the most delicate simplicity and elegance. About five miles from the city, on the west bank of the Jumna, is the Tajee Mahal, a mausoleum built by Shah Jehan to the memory of his wife, the Begum Noor-jehan. It is surrounded by a garden, which, as well as the tomb itself, is kept in excellent order by the British authorities, who have a garrison and civil establishment in Agra. The building, which is of white marble, is elevated on a terrace of white and yellow marble; it has four tall marble minarets at its four angles, and is surmounted by a dome. It is one of the most beautiful specimens of Mohammedan ornamental architecture in Hindustan, or perhaps elsewhere. There is a central college in Agra, with first and second teachers of Arabic, Persian, Oordoo, Hindee, and Sanscrit, besides teachers of the English language, writing, and arithmetic. Agra is one of the military stations of the British government. The city has lately been much improved in consequence of its having become the place of residence of the lieutenant-governor of the North-Western Provinces, and the centre of a considerable commerce between the eastern and western parts of Hindustan. (Hamilton's *Gazetteer*; Balbi, *Géographie*.)

AGRAM, a fortified town, on an eminence, near the Save, 45° 50′ N. lat., 16° 1′ E. long. It is about 150 miles nearly due south of Vienna. Agram is the chief town of Austrian Croatia, and the residence of the Viceroy of Croatia and Slavonia. It is the seat of a bishop, has an academy, a grammar-school, and a convent of Franciscans. The population is stated at above 17,000.

AGRARIAN LAWS (Agrariæ Leges). Those enactments were called Agrarian Laws by the Romans which related to the public lands (*Ager Publicus*). The objects of these agrarian laws were various. A law (*lex*) for the establishment of a colony and the assignment of tracts of land to the colonists was an agrarian law. The laws which regulated the use and enjoyment of the public lands, and gave the ownership of portions of them to the commonalty (*plebes*) were also agrarian laws. Those agrarian laws indeed which assigned small allotments to the plebeians, varying in amount from two jugera to seven jugera (a jugerum is about three-fourths of an English acre), were among the most important; but the agrarian laws, or those clauses of agrarian laws which limited the amount of Public Land which a man could use and enjoy, without having the ownership, are usually meant when the term agrarian laws is now used.

The origin of the Roman public land, or of the greater part of it, was this: Rome had originally a small territory, but by a series of conquests carried on for many centuries she finally obtained the political dominion of the whole Italian peninsula. When the Romans conquered an Italian state, they seized a part of the lands of the conquered people; for it was a Roman principle that the conquered people lost everything with the loss of their political independence; and what they enjoyed after the conquest was a gift from the generosity of the conqueror. A state which submitted got better terms than one which made an obstinate resistance. Sometimes a third of their

land was taken from the conquered state, and sometimes two thirds. It is not said how this arrangement was effected; whether each landowner lost a third, or whether an entire third was taken in the lump, and the conquered people were left to equalize the loss among themselves. But there were probably in all parts of Italy large tracts of uncultivated ground which were under pasture, and these tracts would form a part of the Roman share, for we find that pasture land was a considerable portion of the Roman public land. The ravages of war also often left many of the conquered tracts in a desolate condition, and these tracts formed part of the conqueror's share. The lands thus acquired could not always be carefully measured at the time of the conquest, and they were not always immediately sold or assigned, that is, allotted and marked out by bounds (*signa*), to the citizens. The Roman state retained the ownership of such public lands as were not sold or given in allotments, but allowed them to be occupied and enjoyed by any Roman citizen, or probably by the patricians only at first, and in some cases certainly by the citizens of allied and friendly states, on the payment of a certain rent, which was one-tenth of the produce of arable land and one-fifth of the produce of land planted with the vine, the fig, the olive, and of other trees the produce of which was valuable, as the pine. It does not appear that this occupation was originally regulated by any rules: it is stated that public notice was given that the lands might be occupied on such terms as above mentioned. The patricians had originally claimed the sole right to the enjoyment, but the plebes also participated in it, at least after the date of the Licinian laws. Such an arrangement would certainly be favourable to agriculture. The state would have found it difficult to get purchasers for all its acquisitions; and it would not have been politic to have made a free gift of all those conquered lands, which, under proper management, would furnish a revenue to the state. Those who had capital, great or small, could get the use of land without buying it, on the condition of paying a moderate rent, which depended on the produce. The rent may not always have been paid in kind, but still the amount of the rent would be equivalent to a portion of the produce. The state, as already observed, was the owner of the land: the occupier, who was legally entitled the Possessor, had only the use (*usus*). This is the account of Appian ('Civil Wars,' i. 7, &c.). The account of Plutarch ('Tiberius Gracchus,' 8) is in some respects different. Whatever land the Romans took from their neighbours in war, they sold part, and the rest they made public, and gave to the poor to cultivate, on the payment of a small rent to the treasury (*aerarium*); but as the rich began to offer a higher rent, and ejected the poor, a law was passed which forbade any person to hold more than 500 jugera of (public) land. The law to which he alludes was one of the Licinian laws ('Camillus,' 39). The account of Plutarch is not clear, nor is it supported by the same probabilities as that of Appian.

This mode of occupying the land continued for a long period. It is not stated by any authority

that there was originally any limit to the amount which an individual might occupy. In course of time these possessions (*possessiones*), as they were called, though they could not be considered by the possessors as their own, were dealt with as if they were. They made permanent improvements on them, they erected houses and other buildings, they bought and sold possessions like other property, gave them as portions with their daughters, and transmitted them to their children. There is no doubt that a possessor had a good title to his possession against all claimants; and there must have been legal remedies in cases of trespass, intrusion, and other disturbances of possession. In course of time very large tracts had come into the possession of wealthy individuals, and the small occupiers had sold their possessions, and in some cases, it is said, had been ejected, though it is not said how, by a powerful neighbour. This, it is further said, arose in a great degree from the constant demands of the state for the services of her citizens in war. The possessors were often called from their fields to serve in the armies, and if they were too poor to employ labourers in their absence, or if they had no slaves, their farms must have been neglected. The rich stocked their estates with slaves, and refused to employ free labourers; because free men were liable to military service, and slaves were not. The free population of many parts of Italy thus gradually decreased, the possessions of the rich were extended, and most of the labourers were slaves. The Italian allies of Rome, who served in her armies and won her victories, were ground down by poverty, taxes, and military service. They had not even the resources of living by their labour, for the rich would only employ slaves; and though slave labour under ordinary circumstances is not so profitable as free labour, it would be more profitable in a state of society in which the free labourers were liable at all times to be called out to military service. Besides this, the Roman agricultural slave was hard worked, and an unfeeling master might contrive to make a good profit out of him by a few years of bondage; and if he died, his place would readily be supplied by a new purchase. Such a system of cultivation might be profitable to a few wealthy capitalists, and would ensure a large amount of surplus produce for the market; but the political consequences would be injurious.

The first proposition of an agrarian law, according to Livy, was that of the consul Spurius Cassius, B.C. 484, a measure, as Livy (ii. 41) observes, which was never proposed up to his time (the period of Augustus) without exciting the greatest commotion. Cassius failed in his measure, was tried on some charge of treasonable designs, condemned, and executed.

In B.C. 375, the tribunes C. Licinius Stolo and L. Sextius brought forward among other measures an agrarian law, which after much opposition was carried in the year B.C. 365. The measures of Licinius and his colleague are generally spoken of under the name of the Licinian Rogations. The provisions of these laws are not very exactly known, but the principal part of them may be collected from Livy (vi. 35), Plutarch ('Tib. Gracchus,' 8),

and Appian ('Civil Wars,' i. 8). The Licinian Rogations have been the subject of much discussion among modern scholars. Their main object, as stated by the ancient authorities, was to limit the amount of public land which an individual could possess, that is, enjoy.

About two hundred and thirty years after the passing of the Licinian Rogations, the tribune Tiberius Sempronius Gracchus, who was of a plebeian but noble family, brought forward his agrarian law, B.C. 133. The same complaints were still made as in the time of Licinius: there was general poverty, diminished population, and a great number of servile labourers. His object was to restore the limitation which Licinius had put on the enjoyment of public land, and to distribute what remained, after the law was enforced, among the poor in small allotments. Tiberius Gracchus lost his life in a tumult which was caused by the opponents to his measures, which had been partially effected. (Plutarch, 'Tib. Gracchus.')

Caius Gracchus, who was tribune B.C. 123, renewed the agrarian law of his brother. He carried measures for the establishment of several colonies, which were to be composed of those citizens who were to receive grants of land. A variety of other measures, some of undoubted value, were passed in his tribunate. Caius was murdered by the party of nobility, B.C. 121, when he was a third time a candidate for the tribunate.

The agitation for agrarian laws and division of land among the poor was renewed at intervals after the death of Caius Gracchus, and generally by those who were seeking popular favour. In B.C. 60, the tribune Flavius brought forward an agrarian law, at the instigation of Pompeius, who had just returned from Asia, and wished to distribute lands among his soldiers. Cicero, in a letter to Atticus (i. 19), says of this measure, 'One part of the law I made no opposition to, which was this, that land should be bought with the money to arise for the next five years from the new sources of revenue (acquired by Pompeius's conquest of Asia). The senate opposed the whole of this agrarian measure from suspicion that the object was to give Pompeius some additional power, for he had shown a great eagerness for the passing of the law. I proposed to confirm all private persons in their possessions; and this I did without offending those who were to be benefited by the law; and I satisfied the people and Pompeius, for I wished to do that too, by supporting the measure for buying lands. This measure, if properly carried into effect, seemed to me well adapted to clear the city of the dregs of the populace, and to people the wastes of Italy.' A disturbance in Gallia Cisalpina stopped this measure of Flavius; but it was reproduced, as amended by Cicero, by C. Julius Cæsar, who was consul in the following year, B.C. 59. The measure was opposed by the senate, on which Cæsar went further than he at first intended, and included the Stellatis Ager and Campanian land in his law. This fertile tract was distributed among twenty thousand citizens who had the qualification which the law required, of three children or more. Cicero observes ('Ad. Attic.' ii. 16), 'That after the distribution of the Campanian lands and the abolition of the customs duties (*portoria*), there was no revenue left that the state could raise in Italy, except the twentieth which came from the sale and manumission of slaves.' After the death of Julius Cæsar, his great nephew Octavianus, at his own cost and without any authority, raised an army from these settlers at Capua and the neighbouring colonies of Casilinum and Calatia, which enabled him to exact from the senate a confirmation of this illegal proceeding, and a commission to prosecute the war against Marcus Antonius. Those who had received lands by the law of the uncle supported the nephew in his ambitious designs, and thus the settlement of the Campanian territory prepared the way for the final abolition of the republic. (Compare Dion. Cassius, xxxviii. 1—7, and xlv. 12.)

The character of the Roman agrarian laws may be collected from this sketch. They had two objects: one was to limit the amount of public land which an individual could enjoy; the other, and, in the later Republic, the main object of the agrarian laws, was to distribute public land from time to time among the poorer sort and veteran soldiers.

The allotments probably seldom exceeded seven jugera, about five English acres, and often less. Sometimes allotments of twelve jugera are spoken of. (Cicero, 'Against Rullus,' ii. 31.) The object of Tiberius Gracchus in this part of his legislation is clearly expressed; it was to encourage men to marry and to procreate children, and to supply the state with soldiers. To a Roman of that age, the regular supply of the army with good soldiers would seem a sound measure of policy: and the furnishing the poorer citizens with inducement enough to procreate children, the duty of a wise legislator. There is no evidence to show what was the effect on agriculture of these allotments; but the ordinary results would be, if the lands were well cultivated, that there might be enough raised for the consumption of a small family; but there would be little surplus for sale or the general supply, and no means of employment for an increasing population. These allotments might, however, completely fulfil the purpose of the legislators. War, not peace, was the condition of the Roman state, and the regular demand for soldiers which the war would create, would act precisely like the regular emigration of the young men in some of the New England states: the wars would give employment to the young males, and the constant drain thus caused would be a constant stimulus to procreation. Thus a country from which there is a steady emigration of males never fails to keep up and even to increase its numbers. What would be done with the young females who would be called into existence under this system, it is not easy to conjecture; and in the absence of all evidence, we must be content to remain in ignorance. It is not stated how these settlers obtained the necessary capital for stocking their farms; but we read in Livy, that on one occasion the plebes were indifferent about the grants of lands, because they had not the means of stocking them; and in another instance we read that the bequest to the Roman

people of the last Attalus, king of Pergamus, was to be divided among the poor who had received grants of lands. A gift of a piece of land to a man who has nothing except his labour, would in many cases be a poor present; and to a man not accustomed to agricultural labour—to the dregs of Rome, of whom Cicero speaks, it would be utterly worthless. There is no possible way of explaining this matter about capital, except by supposing that money was borrowed on the security of the lands assigned, and this will furnish one solution of the difficulties as to the origin of the plebeian debt.

The full consideration of this subject, which ought to be examined in connection with the Roman law of debtor and creditor, and the distribution of grain among the poor of Rome, would require an ample volume. The subject is full of interest, for it forms an important part of the history of the Republic from the time of the legislation of Licinius; and it adds one to the many lessons on record of useless and mischievous legislation. It is true that we must make some distinction between the laws of Licinius and the Gracchi, and such as those proposed by Flavius and others; but all these legislative measures had the vice either of interfering with things that a state should not interfere with, or the folly of trying to remedy by partial measures those evils which grew out of the organization of the state and the nature of the social system.

The nature of the agrarian laws, particularly those of Licinius and the Gracchi, has often been misunderstood in modern times; but it is a mistake to suppose that all scholars were equally in error as to this subject. The statement of Freinsheim, in his Supplement to Livy, of the nature of the legislation of the Gracchi, is clear and exact. But Heyne ('Opuscula,' iv. 351) had the merit of putting the matter in a clear light at a time, during the violence of the French revolution, when the nature of the agrarian laws of Rome was generally misunderstood. Niebuhr, in his 'Roman History,' gave the subject a more complete examination, though he has not escaped error, and his economical views are sometimes absurd. Savigny ('Das Recht des Besitzes,' p. 172, 5th ed.) also has greatly contributed to elucidate the nature of possession of the public land, though the main object of his admirable treatise is the Roman law of possession as relates to private property.

AGREEMENT. [CONTRACT.]

AGRI'COLA, CNÆUS JULIUS, was born on the 13th of June, A.D. 37, at Forum Julii, now Fréjus, then a city of considerable celebrity. His father was Julius Græcinus, a writer on agriculture, and distinguished, as a senator, for his eloquence and his integrity. But his virtues were the cause of his destruction. The Emperor Caligula being desirous to get rid of his father-in-law, M. Silanus, called upon Græcinus to undertake the accusation which was to be the pretext for his destruction. Græcinus refused, and he met with the same fate as the unfortunate Silanus. Agricola was an infant at the time of his father's death. His mother was Julia Procilla, and thus on both sides Agricola was connected with the Julia gens, or house. It is most probable that the name was originally obtained by the ancestors of Agricola as freedmen of Julius Cæsar or Augustus. We find them at any rate connected with a colony, Forum Julii, which appears to have been founded by the former, for it existed in the time of Cicero; and, again, the grandfathers of Agricola on both sides held the dignity of procurator, or chief fiscal officer in the provinces, which was not uncommonly bestowed on the favourite freedmen of the Cæsars. After receiving his education at Massilia (Marseille), the principal seat of learning in Gaul, he was sent to Britain, where he served under Suetonius Paulinus; and his service in this island included perhaps the most critical period during the Roman occupancy. During this time broke out the insurrection under Boadicea (A.D. 61), who availing herself of the absence of Suetonius in his attack upon the sacred island of the Druids (Anglesey), fell upon the three chief settlements of the Romans—Camalodunum (commonly supposed to be Maldon in Essex), St. Albans, and London, and massacred seventy thousand men; for which Suetonius soon after exacted ample vengeance. In 62 Agricola returned to Rome, where he married Domitia Decidiana, a lady belonging to one of the first families. He was now elected quæstor, and received Asia for his province, the wealth of which too often tempted the cupidity of Roman officers; and, on the present occasion, the Proconsul Salvius Titianus (a brother of the future emperor Otho) would willingly have made a compromise with his quæstor for mutual impunity; but Agricola did not yield to the temptation. During the latter part of Nero's reign, Agricola, knowing the jealousy of the emperor, endeavoured, even when holding the offices of tribune and prætor, to avoid all appearance of ostentation and ambition. On the accession of Galba, A.D. 68, he was selected as a commissioner to examine the state of the treasures belonging to the temples, and to restore to them whatever had been taken away; for under Nero the valuable gifts consecrated in the temples had been often seized to fill the empty coffers of the prince. At the commencement of the contest between Otho and Vitellius for the empire, his mother was murdered by a detachment from Otho's fleet which landed in Liguria and ravaged the property of the family near Intemelii (Vintimiglia). As Agricola was hastening to pay the last offices to his mother, he learned that Vespasian had been proclaimed by the legions in the east. He instantly declared in his favour, and was soon rewarded by the command of the twentieth legion in Britain, A.D. 70. He returned to Rome about 73, was enrolled by the emperor among the patricians, and soon after appointed governor of Aquitania, a province which included all the south-western part of Gallia from the Pyrenees to the Loire. This appointment he held for nearly three years, and his successful administration of this peaceable province proved him to possess abilities beyond those of a mere soldier. He was recalled to receive the honour of the consulship, A.D. 77. His daughter, Domitia, born during his quæstorship in Asia, was now betrothed to the historian,

C. Cornelius Tacitus, and the next year she was given to him in marriage. Agricola, at the expiration of his consulship, was appointed governor in chief of Britain, whither he proceeded in A.D. 78. Agricola passed seven or perhaps eight summers in Britain; in the first of which he added North Wales and the island of Anglesey to the Roman province. By the end of the fourth campaign, the whole island south of the Clyde and the Forth was secured to the Romans by a line of forts running from the one æstuary to the other. Every summer extended the dominion of the Roman arms, but it was only in the last year of his government that he entirely broke the spirit of the Britons, by the defeat of Galgacus at the Grampian Hills, A.D. 84. At the close of this campaign a Roman fleet sailed round the island. The splendid successes of Agricola were, however, unpalatable to the suspicious Domitian, who had succeeded his brother Titus, A.D. 81. The emperor could not fail to observe how ready the people would be to contrast the campaigns of Agricola with his own pretended victories over the Germans. Agricola was honourably recalled, under the pretext of being sent as governor to Syria. By order of Domitian he entered Rome at night, and after a cold reception by the emperor he quietly retired into private life. When his consular rank a few years after entitled him to the proconsulship of Asia or Africa, he wisely declined an appointment which had been fatal to the previous possessor. He died in the autumn of A.D. 93, in the fifty-seventh year of his age, not without some suspicion of poison. His property was left between his wife Domitia, his only surviving child, and the emperor Domitian. Domitian appeared highly pleased at this mark of esteem, but, as the historian observes, a good father never bequeaths his property to a good prince. All that we know of Agricola, with the exception of a single chapter in Xiphilinus (Dion, lib. 56, ed. Reimarus), which is very inaccurate, is from his Life by Tacitus.

AGRI'COLA, RODOLPHUS, one of the most learned and remarkable men of the fifteenth century, was born at a village two or three miles from Groningen, in Friesland, about the end of August, 1443. After distinguishing himself at school he proceeded to the college of Louvain, where he remained till he took his degree of M.A. According to a custom, common with the students of that age, he set out on his travels, and came to Paris. After remaining here for some time he proceeded to Italy, and arrived at Ferrara in 1476, where he resided during that and the following year, and attended the prelections of Theodore Gaza on the Greek language. He also extended his own reputation by giving a similar course on the language and literature of Rome. After visiting Rome, and some of the other cities of Italy, he returned to Holland, probably in 1479. In the year 1482 he removed to Heidelberg, where a sudden attack of illness carried him off in 1485, at the early age of forty-two. There was certainly no literary name out of Italy so celebrated as that of Agricola during his age; and, if we except Politian and Mirandola, perhaps not even Italy could produce a scholar equal to him. Besides his skill in ancient learning, Agricola was a skilful practitioner of the arts of music and painting. His collected works were published in two volumes 4to, at Cologne, in 1539, but the collection is not complete. The work 'De Inventione Dialectica' is the most celebrated of Agricola's performances. It is considered to have been one of the earliest treatises which attempted to change the scholastic philosophy of the day.

AGRICULTURAL INSTITUTIONS. In this article it is proposed to give some account of various institutions for the improvement of agriculture.

The Board of Agriculture was established chiefly through the exertions of the late Sir John Sinclair, and was incorporated in 1793. One of its first proceedings was to commence a survey of all the English counties on a uniform plan. The 'Surveys' were useful at the time in developing more rapidly the agricultural resources of the country. During the years of scarcity, at the end of the last and beginning of the present century, the Board of Agriculture took upon itself to suggest, and as far as possible provide, remedies for the dearth, by collecting information and making reports to the government on the state of the crops. The statistics which the board collected were also at times made use of by the minister, or at least were believed to be so, in connection with his schemes of taxation. The board encouraged experiments and improvements in agriculture by prizes, and it naturally exercised considerable influence over the provincial agricultural societies. The Board of Agriculture was dissolved in 1816. The Smithfield Cattle Club, which has been in existence half a century, and some of the provincial agricultural societies, especially the Bath and West of England Society, which commenced the publication of its 'Transactions' nearly seventy years ago, have been very useful in promoting agricultural improvement.

With the establishment of the 'Royal Agricultural Society of England,' a new æra commenced in the history of institutions for the improvement of English agriculture.

The objects of the Royal Agricultural Society, as set forth in the charter of incorporation, are: 1. To embody such information contained in agricultural publications and in other scientific works as has been proved by practical experience to be useful to the cultivators of the soil. 2. To correspond with agricultural, horticultural, and other scientific societies, both at home and abroad, and to select from such correspondence all information which, according to the opinion of the society, may be likely to lead to practical benefit in the cultivation of the soil. 3. To pay to any occupier of land or other person, who shall undertake, at the request of the society, to ascertain by any experiment how far such information leads to useful results in practice, a remuneration for any loss which he may incur by so doing. 4. To encourage men of science in their attention to the improvement of agricultural implements, the construction of farm-buildings and cottages, the application of chemistry to the general purposes of

agriculture, the destruction of insects injurious to vegetable life, and the eradication of weeds. 5. To promote the discovery of new varieties of grain and other vegetables useful to man, or for the food of domestic animals. 6. To collect information with regard to the management of wood, plantations, and fences, and on every other subject connected with rural improvement. 7. To take measures for the improvement of the education of those who depend upon the cultivation of the soil for their support. 8. To take measures for improving the veterinary art, as applied to cattle, sheep, and pigs. 9. At the meetings of the society in the country, by the distribution of prizes and by other means, to encourage the best mode of farm cultivation and the breed of live stock. 10. To promote the comfort and welfare of labourers, and to encourage the improved management of their cottages and gardens.

The country meetings take place annually in July. England and Wales are divided into nine great districts, and a place of meeting in each is fixed upon about a year beforehand.

The success of the Royal Agricultural Society has revived the spirit of existing associations, or led to the formation of new ones. In Johnson and Shaw's 'Farmer's Almanac' for 1845, there is a list of agricultural societies in the United Kingdom, but it is confessedly imperfect; the number cannot be less than four hundred. The Yorkshire Agricultural Society holds its annual show in the different towns of that county in rotation. Farmers' clubs have also recently become very numerous. The 'Farmer's Almanac' for 1845 gives a list of above one hundred and fifty of these clubs. They are eminently practical; but the local results which they collect and discuss may become applicable to other parts of the country placed under similar circumstances of aspect, soil, and situation.

The agriculture of Scotland has been largely indebted to the societies which have been established at different periods for its improvement. A 'Society of Improvers in the Knowledge of Agriculture in Scotland' was established in 1723, and some of its transactions were published. The society becoming extinct, was succeeded by another in 1755; and the society which now stands in the same relation to Scotland as the Royal Agricultural Society to England was established in 1784. It is entitled the 'Highland and Agricultural Society of Scotland.' The constitution and proceedings of the society are as nearly as possible similar to the English society.

In 1841 the 'Royal Agricultural Improvement Society of Ireland' was established on the plan of the Royal Agricultural Society of England.

In England there are no institutions of a public nature which combine scientific with practical instruction in agriculture. The advantage of establishing such an institution was suggested by the poet Cowley; and in 1799 Marshall published 'Proposals for a Royal Institute or College of Agriculture and other branches of Rural Economy.' There is the Sibthorpian Professorship of Rural Economy in the University of Oxford; at the University of Edinburgh there are professorships of agriculture and agricultural chemistry; and at the University of Aberdeen there are lectures on agriculture. The botanical, geological, and chemical professorships and lectures in the different universities are, however, to a certain extent auxiliary to the science of agriculture. The Earl of Ducie has established a model or example farm on his estate in Gloucestershire; and farms of this description are of considerable local advantage. In 1839, the late B. F. Duppa, Esq., published a short pamphlet entitled 'Agricultural Colleges, or Schools, for the Sons of Farmers,' which contains many useful suggestions for the establishment of such institutions. In the Agricultural College and model Farm at Cirencester the pupils receive an education at once practical and scientific, under a person thoroughly acquainted with the management of a farm, associated with a professor of chemistry, mechanics, &c.

In Ireland the government affords direct encouragement to agricultural education through the instrumentality of the Board of National Education. The persons who are trained for the office of teachers in the national schools are required to attend the lectures of a professor of agricultural chemistry. The Agricultural Seminary at Temple-Moyle, six miles from Londonderry, is one of the most successful experiments which has yet been made in the United Kingdom to establish an institution for agricultural education. It was founded by the North West of Ireland Society in 1827, and up to 1840 had been attended by 418 pupils.

Such societies as the Scottish Agricultural Chemistry Association, established at the close of 1843, are very well calculated to advance the progress of scientific agriculture; and they can be established in any district where a sufficient number of subscribers can be obtained to command the services of a competent chemist. Associations of this nature show how much can be done in this country without any assistance from the state. Landed proprietors who subscribe twenty shillings yearly, and tenants who subscribe ten shillings yearly, are entitled to have performed analyses of soils, manures, &c., according to a scale fixed upon; and if more than a certain number are required, a charge of one-half above the scale is made.

In England, soils are analysed at the Museum of Economic Geology, London, at a charge of one guinea. The establishment is under the superintendence of her Majesty's office of Woods and Forests.

In France there are schools assisted by the state, where young persons can obtain instruction in agriculture, both practical and theoretical. The principal institution of this kind is that at Grignon, where one of the old royal palaces and the domain attached to it, consisting of 1185 acres of arable, pasture, wood, and marsh land, have been given up on certain conditions. The professors are paid by the government, and the pupils are of two grades, one paying 48*l.* a year, and the other 36*l.* For the purpose of imparting theoretical know-

ledge, courses of lectures are given on the following subjects:—1. The rational principles of husbandry, and on the management of a farm. 2. The principles of rural economy applied to the employment of the capital and stock of the farm. 3. The most approved methods of keeping farming accounts. 4. The construction of farm-buildings, roads, and implements used in husbandry. 5. Vegetable physiology and botany. 6. Horticulture. 7. Forest science. 8. The general principles of the veterinary art. 9. The laws relating to property. 10. Geometry applied to the measurement and surveying of land. 11. Geometrical drawing of farming implements. 12. Physics, as applied to agriculture. 13. Chemistry, as applied to the analysis of soils, manures, &c. 14. Certain general notions of mineralogy and geology. 15. Domestic medicine, applied to the uses of husbandmen.

Institutions designed for the improvement of agriculture, and supported by the state, have been established in most parts of Germany. In Prussia there is a public model farm and agricultural academy in nearly every province. The most important of these institutions is the one at Mögelin, in Brandenburg, about 40 miles from Berlin, which was founded by the late king. The establishment consists of a college and a model farm of 1200 acres.

At Hohenheim, in the kingdom of Wirtemberg, two leagues from Stuttgard, an old palace has been appropriatad as an agricultural college. The quantity of land attached to the institution is about 1000 acres. Lectures are delivered by twelve professors on the following subjects:—Mathematics and physics, chemistry and botany, technology, tillage, and other departments of rural economy, forestry, and the veterinary art.

In Bavaria the king has given up the domain attached to the royal palace of Schleissheim for the purposes of a model farm; but a great mistake has been made in selecting land much below the average standard of fertility, which, as well as land of extraordinary productiveness, should be avoided. It is on a much inferior scale to the establishment at Hohenheim.

There are agricultural institutions supported by the state in several other countries of Europe.

(*On Public Institutions for the Advancement of Agricultural Science*, by Dr. Daubeny; Dr. Daubeny's *Lecture on Institutions for the better Education of the Farming Classes, especially with reference to the proposed Agricultural College at Cirencester*, delivered at Oxford, May 14, 1844; *Journals of Royal Agric. Soc. of England*; Dr. Lindley's *Gardener's Chron. and Agric. Gazette*, &c., &c.)

AGRICULTURE. The subject of the cultivation of the earth may be conveniently regarded in three distinct points of view, namely, practically, historically, and economically. It is inconsistent with the plan of this work to give a connected account of the practice, the history, and the statistics of Agriculture. We shall, therefore, only point out here some of the larger divisions in which the subject will be arranged.

1. The *Practice* will be treated principally under the *names* of the principal Crops; the *names* of the principal Implements; and generally in such articles as Arable Land, Draining, Farm, Grass Land, Live Stock, Manures, Planting, Rotation of Crops.

2. The *History* will be treated under the head Husbandry, which will include a brief account of the progress of foreign countries. A branch of the history is given above, Agricultural Institutions.

3. The *Economical Relations* will chiefly be embraced under the heads Allotment System, Corn Trade, Land, Poor Laws, Rent, Tithes.

AGRIGENTUM, now *Girgenti*, a Sicilian city, distinguished by the magnificence and gigantic size of its ruins, which bear evident testimony that the stories related of its extraordinary wealth in old times are not entirely without foundation. It was called by the Greeks A'cragas, and by the Romans Agrigentum. It is situated on the southern coast of Sicily, about two and a half miles from the sea, 37° 17′ N. lat., 13° 28′ E. long. It was a colony from Gela, another city lying on the same coast, to the eastward, founded about B.C. 580, and was at first a free city, then under the government of a single person or *tyrant* (a Greek word merely expressing the assumption of absolute power), of whom the celebrated Phálaris was one. In union with Syracuse Agrigentum resisted the Carthaginians, and defeated them at Himera. When the Athenians invaded Sicily in the Peloponnesian war, Agrigentum remained neuter. We find few notices of it again till B.C. 408. At that time the city flourished, according to Diodorus, in wealth and luxury, such as no other state except Rome itself ever exhibited. Of the means by which such wealth was acquired we know nothing, except that extraordinary fertility is ascribed to the soil, and that the resort of foreigners makes it likely that it was a great commercial depôt. The number of citizens is stated by Diodorus (xiii.) at 20,000, and of foreigners settled there 180,000 more, a number probably much exaggerated. In B.C. 406, this prosperous city was again attacked by Carthage, and after an unsuccessful resistance taken, its inhabitants dispersed, and the city razed. From this destruction Agrigentum never recovered. [Girgenti.]

The most remarkable objects mentioned by Diodorus, in his account of the town (xiii. 82), are the temple of Jupiter Olympius, and an artificial lake, seven stadia (or near a mile) in circumference, and twenty cubits (or thirty feet) deep, fed constantly by running streams, and well stocked with fish, which were eaten at the public entertainments. The temple was a most stupendous and magnificent building, according to the account of Diodorus, and the ruins have been examined and well described by C. R. Cockerell, Esq., in the fourth volume of Stuart's 'Athens.' To give some idea of the size of this building, it is stated by Diodorus, and the statement has been confirmed by recent travellers, that the flutings of the columns are wide enough to contain a man in the hollow of each fluting as in a niche. There are also remains of a temple at the S.E. angle

of the ancient city, formerly dedicated to Juno Lucina. Further to the west stands the Temple of Concord, in better preservation, owing to its having been converted into a Christian church. More recently it was restored according to the original design, by the late King of Naples: The portico is perfect, and the columns in good preservation. Both these temples are of the Doric order, and nearly of the same size and plan. A good view of them and the surrounding scenery is to be seen in Mr. Wilkins's 'Magna Græcia.' Of the Temple of Hercules only one pillar remains; of that of Æsculapius only three. The area of the fish-pond is still visible; it is now a garden, as in the time of Diodorus. The form is traceable, and the dimensions seem to be larger than those given by the historian. Other remains of antiquity exist.

AGRIMO'NIA is the name of a plant of the rose tribe, to which the English give the name of agrimony.

The common species, *Agrimonia eupatória*, is frequent by the sides of hedges in fields, on the skirts of woods, and in similar situations all over England.

The leaves, which are astringent and aromatic, have been found useful in the preparation of fever-drinks, and for the cure of slight inflammation in the mouth or throat; on this account agrimony is always reckoned one of our wild medicinal plants, and is often employed as an ingredient in herb teas.

A'GRIOPE (*Agriopus*, Cuv.), a genus of acanthopterygious fishes, belonging to the family which M. Cuvier denominates *Joues: Cuirassés*, and which are distinguished from other families of the same order by having the suborbital plates extending backwards over the cheeks, so as to cover either the whole or the greater part of them, and thus defending them, as it were, with a buckler or cuirass. But what particularly distinguishes the Agriopes from most other genera of fishes, is that they have only nine rays in the pectoral fins. Three species are enumerated by MM. Cuvier and Valenciennes.

1. *Agriopus Torvus*: This fish inhabits Table Bay and the seas around the Cape of Good Hope, where it is called by the Dutch colonists *Zee-paard*, or Sea Horse. This fish exceeds two feet in length, and is common in the markets of Cape Town.

2. Warty Agriope (*A. verrucosus*), is so called from having the skin of the head and body entirely covered with prominent conical tubercles, surrounded at the base with small papillæ. It grows to the same size, and inhabits the same localities, as the preceding species.

3. *Agriopus Peruvianus* is found in the neighbourhood of Lima, and grows to the length of 8 or 9 inches.

AGRIPPA, MARCUS VIPSA'NIUS, was born about 63 B.C., and was within a few months of the same age as Octavius, afterwards known as Octavianus Cæsar, and the Emperor Augustus. Agrippa was the companion of Octavius, at Apollonia, when the news came there of the assassination of the Dictator Cæsar (B.C. 44), who was the great uncle of Octavius. Agrippa accompanied Octavius to Rome, where he immediately became the prosecutor of Cæsar's assassins. In 41 and 40 he took an important part in the war against Lucius Antonius; and the capture of Perusia, which brought that war to a conclusion, was in a great measure due to Agrippa. In his consulship, B.C. 37 (or perhaps the year before his consulship), he gained a victory over the Aquitani, and also led a Roman army across the Rhine. A large portion of this year was employed by Octavianus in preparing a fleet to oppose Sextus Pompeius, whose superiority at sea enabled him to command the whole coast of Italy. Agrippa, who was summoned to Rome on this emergency, began his operations by cutting a passage through the barrier of Hercules, which separated the Lucrine Lake from the sea, and he thus converted that lake and the interior lake of the Avernus into a harbour, which was called Portus Julius. In the following year he commanded the fleet of Octavianus in the victory off Mylæ; and afterwards in that more decisive contest which annihilated the power of Sextus Pompeius, and gave to Octavianus the possession of Sicily. In the year 33, though already of consular rank, he held the office of ædile, his administration of which was distinguished by the restoration of the aqueducts, the improvement of the sewers of Rome, and the erection of fountains. In the naval victory off Actium (B.C. 31), which left Octavianus without a rival, Agrippa was again the admiral of the successful fleet. In reward for these services he shared with Mæcenas the full confidence of Octavianus, who associated him with himself in the important task of reviewing the senate. In B.C. 28, Agrippa was again consul, and he married Marcella, the niece of Octavianus, to whom in the following year the senate gave the title of Augustus. In his third consulship (B.C. 27), in which year Octavianus received the title of Augustus, Agrippa dedicated to Jupiter, in commemoration of the victory near Actium, the Pantheon, which remains to the present day, under the name of the Rotonda; the building still bears the inscription which commemorates the founder,—'M. Agrippa L. F. Cos. tertium fecit.' In B.C. 25 he assisted Augustus in the reduction of the Cantabri.

When Julia, the daughter of Augustus, married Marcellus, there was some jealousy between Agrippa and Marcellus, who seemed designed to succeed to the power of Augustus. Agrippa was sent by Augustus into honourable exile, as governor of Syria; but on the death of Marcellus he was recalled to Rome, and, at the request of the emperor, divorced his wife Marcella to marry Julia. In B.C. 19 he finally subdued the Cantabri, who had again been in arms for more than two years; and in B.C. 17 he proceeded a second time to the East, where his administration seems to have given general satisfaction, more especially among the Jewish nation. (Josephus, 'Jew. Ant.,' ch. vi. 2.). His last military duty was to quell an insurrection among the Pannonians, for which his presence was sufficient. He died in Italy, in March, B.C. 12, and was

buried in the mausoleum of Augustus. His family, by Julia, were the two young Cæsars, Caius and Lucius, Julia, Agrippina, and Agrippa Póstumus, born, as his name imports, after the death of his father. He had a daughter, Vipsania, by his wife Pomponia, before his marriage with Marcella. There are various medals of Agrippa extant, one of which represents him with a naval crown, the symbol of his victories by sea.

(Appian, *Civil Wars*, lib. 3—5; Dion Cassius, lib. 45—54; Livy, *Epitome*, 117—136.)

AGRIPPA, HENRY CORNELIUS, may be ranked with his contemporaries, Paracelsus and Cardan, as at once a man of learning and talent, and a quack. Each of the three was probably to a certain extent the dupe of his own pretensions. Agrippa was born at Cologne, of a noble and ancient family, on the 14th of September, 1486. About his twentieth year he seems to have assumed the character of a scholar, and to have commenced a wandering life. The profession which he took up was that of a physician; but he allowed himself also to be regarded as an alchemist, an astrologer, and even as a practitioner of magical arts. After having led for many years what may almost be called a fugitive life, this singular character died at Grenoble, in 1535.

AGRIPPA, HEROD, son of Aristobulus, king of Judea. [HEROD.]

AGRIPPA, HEROD, son of the above. [HEROD.]

AGRIPPI'NA, the daughter of M. Vipsanius Agrippa and Julia, married Germanicus, the son of Drusus, and nephew of the Emperor Tiberius, to whom she bore nine children, among whom were Caligula, afterwards emperor, and the second Agrippina, the mother of Nero. On the death of Augustus (A.D. 14), Germanicus and his wife were with the army on the banks of the Rhine, where Agrippina had occasion to display her firmness of purpose and her courage. In the year 17, the disturbed state of the East afforded the Emperor Tiberius a pretext for recalling Germanicus from the command on the Rhine. Agrippina accompanied her husband, and was with him at Antioch in Syria when he fell a victim, at least such was his own conviction, to the arts of Piso and his wife Plancina (A.D. 19). Germanicus, who himself suspected that his life was sacrificed to the hatred of Tiberius and his mother Livia, implored his wife on his death-bed to submit to the evil times. But Agrippina, disregarding his advice, landed at Brundisium, in Italy, with the youthful Caligula and her youngest infant, bearing herself the funeral urn of Germanicus. She lived at Rome for some years, the object of the emperor's jealousy and fears, which her proud bearing was calculated to increase. She was finally banished to the island of Pandataria, where she closed her life by starvation, October 18th, A.D. 33. Her two eldest sons, Nero and Drusus, were also put to death by Tiberius. (Tacitus, *Annals*, lib. 1—6; Suetonius, *Augustus*, *Tiberius*, *Caligula*.)

AGRIPPI'NA, the daughter of Germanicus and Agrippina, was born (before A.D. 17) in the chief town of the Ubii, which she afterwards raised to the rank of a Roman colony, calling it after herself, Colonia Agrippinensis (now Cologne). She was fourteen years of age when Tiberius gave her in marriage to Cn. Domitius Ahenobarbus, by whom she had a son, who at first bore the name of his father, but afterwards under that of Nero became emperor of Rome. After the death of Domitius, her brother Caligula banished her on the ground of her irregular life; but on the accession of Claudius she was recalled from exile, and became the wife of Crispus Passienus. She is said to have caused the death of Passienus; and when her uncle Claudius put his adulterous wife Messalina to death (A.D. 50), Agrippina secured her uncle's affections, and he married her, though such a marriage was contrary to Roman usage (Gaius, i. 62). She had influence enough to bring about a marriage between her son Domitius and Octavia, the daughter of Claudius; and to induce Claudius to adopt her son, who thereupon assumed the name of Nero, though Claudius had already a son Britannicus by Messalina. In A.D. 54, Agrippina completed her ambitious designs by poisoning Claudius, and causing her son Nero to be acknowledged emperor by the soldiers. But the mother and the son could not live in harmony, for each hated and feared the other, and in the sixth year of Nero's reign his mother paid the just penalty of her crimes, and her own son was her murderer (A.D. 60). [NERO.] Agrippina was a woman of literary acquirements, and she wrote some commentaries, of which Tacitus availed himself for his historical writings. They are also quoted by Pliny, Nat. Hist. vii. 8. (Tacitus, *Annals*, lib. 12—14; Dion Cassius, lib. 59—61.)

AGRO'STIS is a genus of grasses, consisting of a considerable number of species with loose-branched capillary panicles of flowers, and a creeping habit.

Two species only are natives of this country, *A. vulgaris*, and *A. alba*, which is abundant in marshy places, where it forms a valuable pasture. Under the name of Irish fiorin grass, this species has been the object of much attention from experimental agriculturists, some of whom, as Dr. Richardson, have extolled its qualities very highly as a marsh-fodder. In England it is best known, along with *A. vulgaris*, under the name of quitch, or quicks, and is generally extirpated as a troublesome weed, in consequence of the rapidity with which, by means of its creeping, rooting, vivacious stems, it spreads and overruns pasture and garden ground.

AGUE belongs to the class of febrile diseases, and is indeed commonly considered as a paradigm or example of fever in general. Fevers are divided into three great classes. In the first the morbid phenomena that constitute the disease continue for a certain length of time; then they wholly disappear: after having been some time absent they again recur, and this repetition and return of the phenomena alternate with one another for many times. The period that elapses between the cessation of the febrile phenomena and their recurrence is called an intermission. Such fevers, then, as are attended with a cessation

or intermission of the febrile symptoms for an observable space of time, are for this reason called *intermittent fevers* or *agues*. This is the first class. In the second class the febrile symptoms do not altogether disappear, but merely diminish in violence; they do not *intermit*, they only *remit*; for this reason this second class of fevers is called *remittent fevers*. In the third class, during the whole course of the disease, there is not only no retrocession of the symptoms, but no noteable diminution of their violence. Such as the phenomena are when the fever is completely formed, such they continue to be with scarcely any variation until its close. For this reason this class of fevers is denominated *continued fevers*.

The concourse and succession of phenomena which constitute a fever is called a paroxysm. An intermittent fever, or an ague, is therefore a fever consisting of a succession of paroxysms, between each of which there is an intermission more or less complete.

The phenomena which constitute a paroxysm of fever are the following:—the person is affected first with a loss of mental vigour, commonly indicated by inaptitude to attend to his usual avocations, or by dullness or confusion of mind. If not simultaneously with very shortly after this mental debility, there comes on a sense of physical weakness. The patient is languid, listless, disinclined to move, while every movement is performed with difficulty, and the effort to move is exhausting. The muscles or organs of motion are not merely weak—they are, at the same time, the seat of several uneasy sensations; the muscles of the extremities, and of the back especially, are affected with the sensation of soreness, as if they had been over-exercised, and this soon increases to decided pain, which is often very severe.

The next train of symptoms is ushered in by pallidness of the face and extremities: the features shrink; the bulk of the external parts is diminished; and the skin over the whole body is in a morbid state, as if drawn tight. Some degree of coldness is now felt, which at first is so slight as scarcely to be noticed, but at length the patient is fully conscious of a sensation of cold, which he commonly feels first in his back, but which thence extends over the whole body. This sensation of coldness increases until it becomes so severe as to produce a tremor in the limbs, amounting sometimes to trembling and shaking, and almost always producing distinct shivering.

From the first approach of the mental and physical languor, the pulse becomes weaker than in health. As the sense of cold comes on the weakness of the pulse is still greater, and it is at the same time always more frequent than natural; often irregular, and sometimes intermittent. * The respiration also is shorter, feebler, and more frequent than in a state of health. The appetite fails; there is sometimes even an aversion to food: frequently the loss of appetite is succeeded by a sense of nausea and sickness, which occasionally increases to vomiting, and with the matter vomited there is, for the most part, a mixture of bile. From the commencement of the paroxysm there is generally some degree of thirst, which increases in urgency as the sensation of cold advances, being always proportioned to, and probably arising from, the dryness and clamminess of the mouth and fauces. Not the secretions of the mouth alone, but all the secretions of the system are diminished. The excretions also are lessened in quantity, and especially the urine, which is scanty and nearly colourless, and the alvine evacuations are usually altogether suppressed. Even in this stage, headache may come on, but it usually does not appear until the following stage.

These symptoms, having continued for some time, at length disappear, and a remarkable change takes place in the character of those that succeed. The sensation of cold gives place to that of heat, and a temperature far greater than that of health prevails over the whole body. The face which had been pallid now becomes flushed and red. The eyes, which had been dull and heavy, are now more bright and glistening than natural. The features of the face and the other parts of the body recover their usual size, and become even more turgid. The pulse becomes more regular, strong, and full, the respiration fuller and more free, and the nausea and vomiting are less urgent: if before there was pain in the head, it now increases in severity; if there was none, it is now sure to come on, and while the sensibility is increased, the intellectual operations are more and more disordered.

By degrees these symptoms also pass away, and are succeeded by a different train. A moisture now breaks out first on the forehead, which, by degrees, extends over the whole body. As the perspiration flows, the heat abates; the pulse becomes slower and softer; the respiration more free; the nausea and vomiting cease; the thirst diminishes; the secretions and excretions are restored; most of the functions return to their ordinary state, and the patient is left comparatively free from disease, feeling only weak and exhausted.

Such are the phenomena that constitute a febrile paroxysm, and such is the order of their succession; and they obviously constitute three distinct states, or, as they are called, stages or fits, viz. the cold, the hot, and the sweating stage.

After one such paroxysm has remained for a certain length of time, it ceases; after it has ceased for a certain length of time, the same series of phenomena again arises, and observes the same course as before, and this alternation is repeated many times. It has been already stated, that the length of time from the end of one paroxysm to the beginning of another is called an *intermission*, while the length of time from the beginning of one paroxysm to the beginning of the next is termed an *interval*.

Different names are given to the different varieties of this fever, according to the length of the *interval*. If one paroxysm be succeeded by another within the space of twenty-four hours, the ague is termed a quotidian; if after forty-eight hours, a tertian; if after seventy-two hours, a quartan; if after ninety-six hours, a quintan. Those with longer intervals are usually termed erratic. The most common form is a tertian; the

next most common a quartan; the next a quotidian; the least frequent a quintan. Agues are likewise divided into vernal and autumnal, the vernal beginning in February, and the autumnal in August. There is a great difference in their character. The vernal in general are milder, and easily cured, while the autumnal are often severe and obstinate.

It sometimes happens that two intermittents attack the same person at the same time, and the ague is then said to be complicated.

From the preceding history of the disease it is clear that the distinguishing character of intermittent fever is the regular return of the paroxysm at a fixed period, the entire cessation of it after a certain time, and the renewal of it after a specific interval, according to the species of the ague. Nevertheless, though these distinct intermissions and accessions are always apparent when the ague is regular, yet in the most severe and formidable cases it entirely loses its intermittent character, and assumes a remittent, or even a continued form.

Exciting Cause of Ague.—That the effluvia which arise from stagnant water or marshy ground are the immediate or the exciting cause of this disease is now universally admitted. What the nature of these effluvia is, is not known. Neither their physical nor their chemical properties have been ascertained. Even their presence is known only by their effects on the human constitution. No other test of their existence has as yet been ascertained. The most distinguished chemists have applied all the resources of their art to the investigation of this subject, but hitherto with so little success, that all which they have ascertained is the mere fact, that in certain situations an aëriform substance is generated capable of producing intermittent, remittent, and continued fever, together with several other painful and dangerous diseases. Some conjecture that this poisonous gas is carbonic acid; others that it is azote; others again that it is hydro-carburetted gas, or hydro-sulphuretted gas; or an undiscovered compound of azote and oxygen called septon.

Though this poison be generated in the greatest abundance and intensity in marshy and swampy ground, yet without doubt it is also produced in situations which have none of the characters of a marsh. Wherever the ground is moist and contains decaying vegetable matter, this poison is capable of being generated. Woods afford it in almost as large a quantity as marshes, because in woods the ground remains a long time damp, and always abounds with decaying vegetable matter. Hence in all the densely wooded parts of England both intermittent and remittent fevers are rife.

There are spots in which this poison is generated in such quantity and intensity as to be capable of killing instantaneously whoever is exposed to it. Exposure to it in certain situations has proved fatal with a rapidity and certainty equalled only by a mortal dose of Prussic acid. Exposure to it in other situations produces what may appear to be, and what is sometimes mistaken for, apoplexy—an affection of the brain causing death more rapidly than almost any other

disease to which the human body is subject. Exposure to it when less concentrated produces malignant fever of a continued form, destroying life in a few days or hours. Exposure to a still smaller concentration produces remittent, and to a yet smaller, the milder form of intermittent fever. And it may be so minute in quantity, or so destitute of virulence in its own nature, as to be incapable of producing even intermittent fever, in its regular and well-marked form, and yet sufficiently potent to produce a long catalogue of grievous maladies. The secondary diseases which have this origin, and which have been much overlooked, consist, for the most part, of those painful affections of the nerves, which have been lately classed together under the general term of *neuralgia*. The exquisitely painful, and too often unmanageable diseases called tic douloureux, the disease called sciatica, the tooth-ache, rheumatism, and more especially periodical head-ache, are oftentimes clearly traceable to this poison, and are as certainly produced by it as the most distinct and regular ague.

Cure.—The first object in the treatment of a person affected with ague is to remove him from the influence of the poison, by taking him out of an unhealthy, and placing him in a healthy situation. Unless this can be done, every remedy employed must act at a great disadvantage, and the power of the poison, or the debility of the patient, may be such as to render every effort to cure the disease unavailing without a change of residence. Often, however, circumstances will not admit of the removal of the patient. Whenever this is the case, the sick person must at least be put and kept in an apartment the most remote from the noxious spot, and it is a good and important general rule to place him in the highest part of the house. When this precaution is neglected, remedies constantly fail which readily and completely succeed when it is observed.

The treatment of ague includes the management during the paroxysm, the intermission, and the convalescence. None of these remedies is suitable to all these periods, and what will effectually cure in one, may prove positively injurious in another.

First, of the treatment during the paroxysm. The approach of the paroxysm should be carefully watched. The moment the first indication of its accession is apparent, whether that indication be afforded by a return of languor, or listlessness, or pain of the head, or a sense of confusion, or, above all, of coldness or chilliness, an emetic, consisting of twenty grains of the powder of ipecacuanha with one grain of the tartar emetic, should be given. The operation of the emetic may be promoted by drinking freely warm water, or warm camomile tea *after* (*but not previously*) the first act of vomiting has occurred. As soon as the operation of the emetic is over, a draught should be taken, consisting of forty drops of laudanum in an ounce and a half of camphor julep. This plan, in almost all cases, will completely stop the coming on of the cold fit; in a great number of cases it will also prevent altogether the accession of the hot fit, inducing at once the sweating stage, that is, the stage which constitutes the solution of the

paroxysm. But if it should not actually stop the accession of the hot stage, it will assuredly diminish its violence and shorten its duration; and as soon as the hot stage is formed, the laudanum should be repeated in smaller doses, namely, in doses of from ten to twelve drops, repeated every hour, and continued until the sweating stage is completely established.

As soon as the cessation of the sweating stage terminates the paroxysm, and the latter is succeeded by the stage of intermission, bark should be freely taken. Of all the preparations of bark, the sulphate of quinine is incomparably the best. The dose is from two to four grains, and the most convenient mode of administering it is in the form of pill. During the whole period of the intermission, the dose of quinine should be repeated every hour, or every two hours, according to the urgency of the case. If the biliary secretion be unhealthy, which it almost always is, it will be useful to combine with every alternate dose of the quinine, from the sixth to the fourth part of a grain of blue pill, together with two grains of the extract of gentian. If the bowels be constipated, the addition to each pill of from one to two grains of the extract of rhubarb will form an excellent aperient. Given in this mode, the extract of rhubarb moderately, but in general effectually, stimulates the alimentary canal, gently increasing its action, without producing purging. If, however, the bowels be constitutionally torpid, or be rendered so by the disease, a more active aperient must be substituted, and such will be found in the compound decoction of aloes, or the infusion of senna with camomile. The condition of the bowels must never be neglected, for a state of constipation will powerfully counteract every remedy.

This plan should be continued without intermission until the recurrence of the symptoms which denote a fresh accession of the paroxysm. Then the quinine, &c. should be suspended, and the emetic should be again repeated, which, as soon as its action has ceased, should be followed by the opiate, and this, on the solution of the paroxysm, by the bark, and so on in a constant series, until the paroxysm return no more. This method of treatment will usually succeed in curing the disease. Other medicines, however, have been employed with success, as arsenic, opium, &c. Ague is frequently complicated with other diseases, and in these cases the treatment must be modified according to the nature of the complication.

AGUESSEAU, HENRI FRANÇOIS D', a chancellor of France. He was born November 27, 1668, at Limoges. His father, who was *intendant* of that province, devoted himself to the education of his son; and he brought him early into notice. At the age of 21 he was admitted an advocate at the Châtelet; and three months afterwards he was made one of the three advocates general. In the year 1700 he was appointed Procureur Général, in which office he employed his authority in most cases wisely and honestly. He reformed the system of the management of public hospitals; and endeavoured to define the limits of particular jurisdictions, to introduce uniformity in the administration of justice throughout the kingdom, and to institute the making of a testamentary disposition of property. D'Aguesseau aspired through life to the high but difficult reputation of a legal reformer; and it is in this particular that his character has the greatest claim upon our respect. His praiseworthy attempts were resisted by many whose mistaken interests suggested to them that the attainment of justice ought to be kept expensive and uncertain, instead of being rendered cheap and secure. In 1717 D'Aguesseau succeeded Voysin in the chancellorship. He did not retain the office long, for he was dismissed and exiled the following year, on account of his opposition to Law's financial system. His perception of the fallacy of this adventurer's schemes for substituting fictitious wealth for real capital, showed that, in some points of political philosophy, his views were sound. His recall, two years afterwards, at the moment of the great crisis brought about by Law's system, was a signal triumph for D'Aguesseau. But Cardinal Dubois, the unworthy favourite of the Regent, claimed precedence in the council; and D'Aguesseau retired from office in 1722, rather than yield to him. He lived quietly at Fresne until 1727, when he was re-appointed chancellor. During the five years of his retirement he assiduously cultivated those literary tastes which so greatly distinguished him amidst the mass of mere lawyers. From the time of his re-appointment to office till 1750 he continued to administer justice uninterruptedly. He then resigned, and died the following year. D'Aguesseau was buried by the side of his wife, in the churchyard of his parish church. A statue representing him is now in front of the Palais Législatif (Chamber of Deputies), by the side of the one erected in honour of L'Hôpital. It was placed there in 1810.

His works, now extant, form 13 vols. 4to. They consist principally of his pleadings and appeals when advocate and Procureur Général, and of his speeches at the opening of the session of Parliament.

AHANTA, the name of a district on the Gold Coast, Africa, which is subject to the sovereign of Ashantee. It occupies the space along the coast between 3° and about 2° 10′ W. long.; its breadth from north to south is very inconsiderable. On the west is the river Ancobra, on the east the river Boosempra. The principal projection of the coast is Cape Three Points. A part of the district abounds in fine gold. (Bowdich's *Mission to Ashantee.*)

AHASUE'RUS or AHASHVEROSH, is the name of the Persian monarch mentioned in the book of Esther. The apocryphal additions to that book, as well as the Septuagint, and Josephus, call him Arthasastha or Artaxerxes; he is probably the same king as the Artaxerxes Longimanus of the Greek historians, whose reign commenced B.C. 465. The name Ahasuerus occurs also Dan. ix. 1, where some interpreters take it for Astynges, king of the Medes; and Ezra iv. 6, where Cambyses seems to be meant by it. (Eichhorn's *Repertorium für biblische und Orientalische Literatur*, vol. xv.: p. 1. seq.).

AHAZ or ACHAZ, the son of Jotham

(2 Kings, xv. 38, xvi. &c.) a king of Judah, who reigned 743–728 B.C., and was contemporary with the prophets Isaiah, Hosea, and Micah. Another Achaz is mentioned, 1 Chron. viii. 35; ix. 42.

AHAZIAH, also written ACHAZIAH or AHAZIAHU, son of Ahab, a king of Israel, who reigned 897–896 B.C. (1 Kings, xxii. 40; 2 Chron. xx. 35.) Another Ahaziah, son of Jehoram, was king of Judah, 884–883 B.C. (2 Kings, viii. 24.; ix. 16), who occurs also under the name of Jehoahaz (2 Chron. xxi. 17) and Azariahu (xxii. 6.)

AHMED I., fourteenth sultan of the Ottoman empire, was son of Sultan Mohammed III. He came to the throne in the year 1603, and died in 1617. He was unfortunate in a war with Shah Abbas of Persia, and his government was disturbed, in the Asiatic part of his dominions, by two daring adventurers, Kalender Ogli and Janbulad-zade: both were finally subdued, and in 1609 tranquillity was restored in the interior of the empire. Ahmed was of a mild and moderate disposition, and fond of the enjoyments of a quiet and luxurious life.

AHMED II., son and successor of Sultan Soleiman III., who occupied the throne of the Ottoman empire from 1691 till 1695. He owed his elevation to the throne chiefly to the influence of the celebrated grand-vizier Kiuprili or Kiuperli, who soon afterwards fell in a battle against the Austrians. His reign is marked by many disastrous events. The plague, a famine, and an earthquake, desolated the empire, and the capital was afflicted with a destructive fire. The Bedouins of the Arabian desert, in defiance of the imperial safeguard, dared to attack the caravan of the Mecca pilgrims; and at sea the Turkish empire was infested by the Venetians, who took possession of the island of Chios, and even threatened Smyrna. His successor was Mustafa II.

AHMED III., son of Sultan Mohammed IV., was raised to the throne of the Ottoman empire in consequence of a revolt of the Janizaries, in 1702. When, in 1709, Charles XII. of Sweden took refuge at Bender, in the Turkish dominions, he was well received by Ahmed, who made him a present of 16,000 ducats. Charles XII. succeeded in kindling a war between the Ottoman Porte and Russia, which turned out favourably for the Turks. Peter was near being captured on the banks of the Pruth, and though he escaped, he was obliged to resign to the Turks the important town of Azof. Ahmed III. also compelled the Venetians to quit the Morea, and to give up the islands of Cerigo and Cerigotto, and their possessions in Candia. But in an attempt to take Hungary from the Austrians, his army was defeated by Prince Eugene, near Belgrado, and by the subsequent peace (made at Passarowitz, in 1718) that town, as well as Orsowa, and part of Servia and Wallachia, came under the Austrian dominion. In 1723 Ahmed entered into a treaty with Russia, and soon afterwards commenced a successful war with Persia, and his conquests were confirmed by a peace; but Nadir Shah, the successor of Ashraf Khan, disregarded these stipulations, and by degrees retook the conquered provinces. These reverses caused a revolt at Constantinople, and Ahmed III. abdicated the throne in favour of his nephew, Mahmud I. (1730). He died six years afterwards in prison, at the age of seventy-four.

AHMEDABAD, a fortified city, situated in a district of the same name in the province of Gujerat, or Guzzerat, and presidency of Bombay, was formerly the Mohammedan capital of the province. It afterwards passed under the sway of the Mahratta chieftains, and in 1818 it came into the permanent possession of the East India Company. The city, which is estimated to contain a population of 100,000 souls, is situated on the banks of the Subermatty river, in 23° 1′ N. lat., and 72° 35′ E. long. It suffered considerable damage from an earthquake in 1819. The distance of Ahmedabad from Bombay, by the usual travelling route, is 321 miles, from Delhi 610, and from Calcutta 1234.

AHMEDNUGGUR, a strongly fortified city of Hindustan, in the province of Aurungabad, and presidency of Bombay, was founded in 1493, by Ahmed Nizam Shah. It subsequently became a part of the Mogul empire, of that of the Mahrattas, of the Peshwa, and of Dowlut Row Scindia. It is now in the possession of the East India Company, and is the head station of a civil, military, and judicial establishment. The city is surrounded by stone walls, and has a fort and a few towers. It contains a handsome square or market-place, and numerous well-built streets. The palace of the former sultans is a massy pile of building, surrounded by a broad moat, faced by solid masonry. The population is about 20,000. It is situated in 19° 10′ N. lat., 74° 50′ E. long., distant 83 miles from Poonah, 181 from Bombay, 830 from Delhi, 1119 from Calcutta.

AHWAZ, or AHWUZ, is a town situated about 100 miles N.E. from Basra, and 48 miles S. from Shuster. The date of its foundation is unknown; but the zenith of its prosperity was attained under the earlier Khalifs of the house of Abbas, nor did it long survive their fall. The ruins of the city of Ahwaz lie on the east bank of the river Karun, 31° 20′ N. lat., 48° 50′ E. long., in a flat and uncultivated country. The modern town of Ahwaz occupies only a small portion of the site of the old city, on the eastern bank of the Karun, and exhibits a mean and solitary appearance when contrasted with the immense mass of ruins. The houses are almost entirely built of stone brought from the ruins, and it can only boast of one decent building, a mosque, apparently modern. The population at present does not exceed 1600. There are remains of the *bund* or dyke that was thrown across the river, chiefly, if not entirely, to favour irrigation, by thus making a head of water. A part of this stone wall is still standing, remarkable for its state of preservation; it is in many places ten feet high, and nearly as many in breadth; while it extends upwards of one hundred feet in length, without any intermediate breach. Many single blocks in it measure eight and ten feet. The river dashes over the *bund* with great violence. The mass of ruins

extends at least ten or twelve miles in a south-easterly direction, while their greatest breadth covers about half that space, forming many large mounds, some of them chiefly of hewn stone, others of brick, tile, pottery, &c. The Arabs are always digging up and removing stones for the purpose of building, but a large city might be erected from the materials still remaining. The ruins of Ahwaz extend also on the west bank of the river in a northerly direction, exhibiting the same appearance as the mounds on each side, but less in magnitude. Ahwaz is generally supposed to be much lower in antiquity than either Babylon, Persepolis, or Susa. Alexander the Great navigated the Karun, but his historians do not mention Ahwaz. (*Transac. of the London Asiatic Soc.* vol. ii.)

AÏ (*Brádypus*, Illiger), one of the names of the common or three-toed sloth. The sloths constitute a very remarkable section or family of the Edentate order of mammalia, respecting which many erroneous opinions were formerly entertained even by naturalists, who regarded their structure as imperfect and grotesque, overlooking the fact that it is in strict accordance with their habits and mode of life. The sloths are leaf-eaters, and arboreal in their habits; they never voluntarily leave the trees, the branches of which they tenant, traversing along them in quest of food, not, however, like the monkey, but suspended from them by means of their long hooked claws, with the back downwards. In this manner they travel with considerable despatch, and pass from tree to tree, their long hook-furnished arms enabling them to reach a branch at a considerable distance. When we contemplate the skeleton of the sloth, the great length of the fore limbs is at once apparent; they are twice as long as the hinder pair; but all are alike terminated by huge hook-like claws. The pelvis is of great breadth, separating the thigh-bones to an unusual distance from each other, and the latter are directed obliquely outwards, while the limb from the knee downwards has an inward inclination. The structure of the wrist and ankle is such that the palm or sole, instead of being directed to the surface of the ground, as in other animals, is turned inwards towards the body, in such a manner as to render it impossible for the sloth to place the sole of its foot straight down on a level surface, compelling it, under such circumstances, to rest upon the external edge of the foot. The hip-joint, as in the orang outan, is destitute of the *ligamentum teres*, whence the head of the thigh-bone is endowed with greater freedom of motion. In the AÏ the neck consists of nine vertebræ instead of seven; and in all the species the two tables of the skull are separated by large air-cells, so that the small brain is defended by a double case, a provision against accidental falls, should the branch to which the animal is clinging give way. The clavicle is united to the scapula; the bones of the metacarpus and metatarsus are soldered to the first phalangeal row of the fingers and toes, the whole being consolidated into one piece, buried in the skin; the claws alone are distinctly uncovered, and these are drawn involuntarily to the palm or sole by powerful elastic ligaments. Rigid however as the paw is, the sloth can use it as an organ of prehension, and convey food to its mouth. The teeth are very simple; there are no incisors, but canines and molars only: in the AÏ the canines are diminutive, and resemble the molars; the latter are four on each side in the upper jaw, and three in the lower; they are cylindrical, and destitute of true roots, and are fitted merely for breaking down the tender buds and leaves on which the animal feeds. The head of the AÏ is short, the muzzle small, the ears concealed in the long hair; the eyes are deeply set; the tail is a mere rudiment. The ribs in the AÏ are 32; in the Unau 46.

The sloths are natives of the forests of South America, and are killed by the Indians for the sake of their flesh; they are a favourite prey, also, of the harpy eagle. Unfitted by their structure for the ground, they pass their lives clinging to the branches of the forest, where they

The AÏ.

rest and travel in security. Their muscular power is enormous, and their tenacity of life astonishing. When attacked they defend themselves with their arms; and on the ground, constrained as are all their movements, they have been known to grasp a dog and hold it, as if within a vice, till it expired. In this manner they grapple with large snakes which infest the dense woods and the humid situations where the *cecropia* grows, on the buds and young shoots of which the sloth principally feeds.

The female has two mammæ, situated on the breast, and she brings forth a single young one at a birth, which clings to its parent, and is carried by her till it acquires sufficient size and strength to shift for itself.

The sloth sleeps with ease and safety in the fork of a tree, its limbs embracing the trunk, and its back resting in the angle of a branch, while the head is buried in the long wool of the bosom, and the animal is rolled up nearly in the form of a ball. The length of the neck of the AÏ, with its two additional vertebræ, enable it to assume this position; and not only so, but to turn its head round with the greatest ease, and, while suspended aloft, to survey the ground beneath in every direction, and thus observe the approach of enemies.

The Aï, of which there are several species, constituting the genus *Acheus* of Fred. Cuvier, are covered with long coarse hair, of a peculiar character, not unlike dry and withered grass. From this appearance of the fur, and from its colour, it is difficult to detect these animals while at rest among the branches covered with long moss and lichens. Their voice is seldom heard; it is said to be a weak plaintive cry resembling the word *aï*, whence their name. The best known species are the *Acheus Aï*, or brand-marked sloth (*à dos brulé*), and the collared sloth, *Acheus torquâtus* (*aï à còllier*). The two-toed sloth, or Unau, (*Brádypus didáctylus*, Lin.), forms the type of the genus *cholœpus* of Illiger; it differs in many structural details from the Aï, and is more active and alert, but its general habits are the same. A living specimen has existed for some time in the Vivarium of the Zool. Soc., London. For more minute details respecting these animals, see Waterton's 'Wanderings;' Harlan, in the 'American Journal of Geology and Science,' May 1832; Prof. Buckland, in 'Linn. Trans.' vol. xvii. pt. 1; Cuvier's 'Ossemens Fossiles,' vol. v.; Stedman's 'History of Surinam.' We may conclude by observing, that their organization is in perfect harmony with their habits and instincts, as much so as that of the bats for flight, or of the whale for the waters of the ocean. If not intelligent, they at least enjoy their existence, and fulfil their appointed part in the economy of creation.

AIA-SOLOUK, or AIA-SALUK, erroneously supposed to occupy the site of Ephesus. [EPHESUS.]

AIDE-DE-CAMP, a French term which denotes a military officer, usually of the rank of captain, one or more of whom is attached to every general officer, by whom all his orders are conveyed to the different parts of his command. A field-marshal is entitled to four, a lieutenant-general to two, and a major-general to one. The queen appoints as many aides-de-camp as she pleases, and this situation confers the rank of colonel. The number of aides-de-camp to the queen is generally about thirty, besides about twelve naval aides-de-camp, one of whom is of the rank of admiral.

AIDS (directly from the French *Aides*, which in the sense of a tax is used only in the plural number). Under the feudal system, aids were claims of the lord upon the vassal, which were not so directly connected with the tenure of land as reliefs, fines, and escheats. The nature of these claims, called Auxilia, seems to be indicated by the term: they were originally rather extraordinary contributions than demands due according to the strict feudal system, though they were founded on the relation of lord and vassal. These aids varied according to local custom, and became in course of time oppressive exactions. The aids which are mentioned in the Grand Coustumier of Normandy for knighting the lord's eldest son, for marrying his eldest daughter, and for ransoming the lord from captivity, were also in use in England, and were probably introduced by the Normans. But other aids were also established by usage or the exactions of the lords, for by Magna Charta, c. 12, it was provided that the king should take no aids, except the three above mentioned, without the consent of parliament, and that the inferior lords should not take any other aids.

The amount of the two aids for knighting the lord's eldest son and marrying his eldest daughter was limited to a certain sum by the Statute of Westminster 1, 3 Ed. I. c. 36. The aid which was to ransom the lord when taken prisoner, was of course uncertain in amount. Aids for knighting the lord's son and marrying the lord's daughter are abolished by the stat. 12 Car. II. c. 24, and the aid for ransoming the lord's person is obsolete.

Aids is also a general name for the extraordinary grants which are made by the House of Commons to the crown for various purposes. In this sense, aids, subsidies, and the modern term supplies, are the same thing. The aids were in fact the origin of the modern system of taxation.

Auxilia is the Latin word used by Bracton and other writers when they are speaking of the feudal aids above enumerated. The word *Aide* is derived from the Low Latin *Adiuda*. (Du Cange, 'Gloss. Med. et Infim. Latin.') The Spanish form *ayuda*, 'assistance,' and the Italian *aiuto*, also clearly indicate the origin of the word 'aide,' which is from the participial form *adjuta* of the Latin verb *adjuvare*.

AIKIN, JOHN, M.D., born in 1747, was the only son of the Rev. John Aikin, D.D., for many years tutor in divinity at the dissenting academy of Warrington, in Lancashire. He was educated chiefly at Warrington, and having chosen the medical profession, he studied at the University of Edinburgh, and was subsequently a pupil of Dr. William Hunter. As a surgeon, he first settled at Chester, and afterwards at Warrington; but finally, took the degree of Doctor of Medicine at Leyden, and established himself as a physician in London. He is now chiefly remembered as a popular author; and to him, in conjunction with his sister, Mrs. Barbauld, we owe some of the first and best attempts to take science out of the narrow confines of the professionally learned, and to render it the means of enlarging the understandings and increasing the pleasures of the general body of readers. The most popular, as well as the most useful of Dr. Aikin's works, still maintains its reputation—'Evenings at Home.' The volumes of this work appeared successively, the sixth and last in June, 1795. This was the joint production of Dr. Aikin and Mrs. Barbauld, whose contributions, however, did not exceed half a volume in the whole. The object of these volumes was a favourite one with their authors, who desired to teach things rather than words. In the execution of the task, they presented, in a manner sufficiently attractive to engage the attention of young persons, a good deal of natural history, with some of the elements of chemistry and mineralogy; but the principal charm and value of the work consist in its just views of human character, and in the uncompromising integrity visible in every line. Another work of Dr. Aikin's has been the foundation of many descriptions of the appearances of nature; but none have surpassed 'The Natural History of the Year' in conciseness and accuracy.

The professional success of Dr. Aikin seems to have been impeded by his zealous endeavours to obtain a recognition from the state of the great principle of liberty of conscience; he was, moreover, of delicate health. In 1798 he relinquished his profession, and passed the remainder of his life at Stoke Newington, constantly employed in various literary undertakings, of which the entire number was very large. He died of a stroke of apoplexy, December 7, 1822.

AIMOIN, a French Benedictine monk, and an historian, who died in 1008. He began a history of the French, which is not much esteemed. He also wrote an account of the life of Abbon, Abbot of Fleuri-sur-Loire; it contains a great number of anecdotes, and frequently alludes to the public circumstances of the times.

AIN, a department of France consisting of the former province of Bresse and a part of Burgundy, is bounded N. by the department of Jura, E. by Savoy and Switzerland, S. by the department of Rhone, and W. by those of Rhone and Saône et Loire. It lies between 45° 35′ and 46° 30′ N. lat., and between 4° 40′ and 5° 55′ E. long. The greatest length of the department is 69 miles from N.W. to S.E., and its greatest breadth at right angles to the length about 50 miles. Its area is estimated at 2288 square miles; the population in 1841 was 355,694, which gives an average of 155 to the square mile, being 13 below the average per square mile for all France.

The department is divided by the Ain, from which it takes its name, into two nearly equal parts. The division on the left bank of the Ain has the Rhone, which is navigated by steamers from Seyssel to its mouth, on the E. and S. for about 110 miles of its course: it consists of mountains intersected by deep fertile valleys, which generally run from N. to S., and are furrowed by rapid streams. The mountains branch off from the Jura and the Alps, and their summits rise to a height of 4,000 to 5,400 feet. There are extensive forests of pine and oak. Iron, asphalte, marble, and lithographic stone are found. The district on the right bank of the Ain is an undulating table land, inclining towards the N.W.; the Saône, which is navigable for steamers from Lyon to Châlons, flows on its western border for about 70 miles. The soil is a light vegetable mould, resting on a compact clay bottom, which accounts for the great number of marshes and ponds in this division. The quantity of marsh, moor, and forest land greatly preponderates; but in the north, which is drier, there is some good land, which is well cultivated. The chief occupation of the inhabitants in the whole department is agriculture. The climate is cold but healthy in the northern and eastern parts: the marshy district on the right bank of the Ain is cold, damp, and unhealthy. The quantity of rain which falls annually is 47·96 inches, or double the quantity which falls at Paris.

The department is watered by a great many small rivers, the chief of which are—the Ain, the Valserine, the Reyssouse, the Veyle, and the Chalaronne. The Ain rises in the Jura mountains, near Nozeroi, runs through the department with a rapid course from N.E. to S.S.W., and enters the Rhone opposite the village of Anthon, having run 105 miles. Timber and firewood are floated down it to the Rhone: boats are built at several places on its banks, and floated down empty to Lyon for sale. Its feeders are the Bienne, the Oignon, the Alberine on the left bank, and on the right the Valouse and the Suran. The Valserine, which also rises in the Jura, forms the boundary between the arrondissements of Nantua and Gex, and after a course of 28 miles falls into the Rhone at Bellegarde. The Reyssouse rises in the canton of Pont d'Ain, runs through Bourg and Pont de Vaux, near which it enters the Saône, after a course of 41 miles from S.E. to N.N.W. The Veyle rises in the marshy district, passes through Pont de Veyle, and falls into the Saône, having run 63 miles from S. to N.N.W. The Chalaronne rises in the same district, and running N.W., falls into the Saône below Thoissey.

The area of the department is 1,464,582 acres, 161,110 of which are covered with forests, and 40,568 with vineyards. Barley, oats, and maize are the principal crops; wheat is grown, but not in quantity sufficient for the consumption of the department. Wines are made, the best of which are the red wines from the environs of Belley and the white wines of Pont de Veyle. The number of horses, sheep, goats, and swine is very great, and great numbers of oxen are fatted on the fine grass lands of the Reyssouse and lower Chalaronne. The department is famous for its poultry and honey. The principal trade is in provisions, timber, fir and oak planks, asphalte, lithographic stones, and the products of its factories, silk, cotton and woollen cloth, glass, paper, and leather.

The department is divided into five arrondissements, which, with the number of cantons, communes, and population in each are as follows:—

Arrond.	Cantons.	Communes.	Pop. in 1841.
Bourg	10	119	121,447
Belley	9	112	79,919
Nantua . . .	6	69	52,242
Gex	3	32	23,040
Trevoux . . .	7	109	79,046
Total. . .	35	441	355,694

In the arrondissement of Bourg, the chief town is Bourg, or Bourg-en-Bresse, the chief town of the department, 46° 12′ N. lat., 5° 13′ E. long.; it stands on the Reyssouse, at a distance by the road of 236 miles S.E. from Paris and 27 N.E. from Lyon; its population is 10,200: there is a weekly market, and fifteen fairs are held annually; its chief trade is in corn, horses, cattle, hides, and poultry. The town is the seat of a tribunal of first instance; it possesses a college, a large public library, and several educational establishments. Outside the town is the church of Notre Dame, built in 1511 by Margaret of Austria, wife of Philip II. of Valois, which is greatly admired as one of the finest specimens of the early Renaissance style, and for its splendid tombs. The

other towns are St. Trivier de Courtoux: Coligny, whence the name of the historical family of the Coligny: Treffort: Pont d'Ain: Pont de Vaux, a well-built town on the Reyssouse, which has potteries and tanyards, and a good corn market; a canal three miles in length connects the town with the Saône: Pont de Veyle, with some cotton factories: Montrevel: St. Etienne des Bois: and Bagé le Châtel.

In the arrondissement of Belley, the chief town is Belley, which is the seat of a bishop, and has a tribunal of first instance and a college; population 5284. It stands on the Suran, and manufactures silk, muslin, and leather: in its neighbourhood excellent lithographic stones are found. The other towns are Amberieux: Lagnieux: St. Rambert, in which iron, linen, silk, calico, and straw-plat are manufactured: Seyssel, on the Rhone, which here is crossed by a stone bridge, and commences to be navigable for steamers; near it are mines of bitumen, from which asphalte is made: Villebois, which has iron mines and quarries. To the S.E. of Belley stands the strong fortress of Pierre Châtel, built on a rock on the right bank of the Rhone.

In the arrondissement of Nantua, the chief town is Nantua, situated in a gorge of the Jura, on the banks of the small lake of Nantua, the surface of which is 1,574 feet above the level of the sea, and its depth 177 feet: the town has a tribunal of first instance, and manufactures of cotton, paper, and leather; population 3684. The other towns are—Brenod: Châtillon de Michaille: Oyonnax, the inhabitants of which are chiefly employed in the turnery and timber trade: Poncin, on the Ain: and Bellegarde, at the junction of the Rhone and the Valserine. The latter town is much visited on account of the disappearance of the Rhone ('la Perte du Rhone') which here flows under a ledge of rock for about 120 yards, and when swollen flows over the rock, so that there is then a fall also.

In the arrondissement of Gex, the chief town is Gex, which stands at the foot of Mount St. Claude; it has some trade in wool, cheese, and watches; population 2650: E. of Gex is Ferney, the residence of Voltaire.

In the arrondissement of Trevoux, the chief town is Trevoux, on the Saône; it has some manufactures of cloth and a market for agricultural produce, which obtains a ready transit by the navigation of the Saône. The other towns are —Mont Luel, which has manufactures of cloth, ribands, and leather: Thoissey, on the Chalaronne: Meximieux: Châtillon les Dombes: and St. Trivier des Dombes, unhealthily situated in the marshes.

The department returns five members to the Chamber of Deputies, belongs to the diocese of Belley, is comprised in the jurisdiction of the Cour Royal and of the University Academy of Lyon, and is included in the seventh military division, the head-quarters of which are at Lyon.

AIN, River. [Ain, Department.]

AIN-TAB, a town of Syria, in the Turkish eyalet, or government, of Marash, is situated on the north bank of a small river which falls into the Sajur, in 37° 3′ N. lat., 37° 27′ E. long. It is a large well-built town, unwalled, but defended by a strong castle on an artificial eminence which is surrounded by a deep ditch. It has manufactures of linen, cotton, morocco leather, and saddles. There are five or six mosques and a large Armenian church. The inhabitants, amounting to about 20,000, are chiefly Mahommedans, intermixed with Armenian Christians and Greeks. Ain-tab is about 65 miles N. by E. from Aleppo, direct distance.

AINSWORTH, ROBERT, was born at Woodyale, about four miles from Manchester, in September, 1660. He was educated at Bolton, where he afterwards taught a school. He then came to London, and formed an establishment at Bethnal Green, from which he removed, first to Hackney, and afterwards to other villages in the neighbourhood of the metropolis. About the year 1714 he was induced by the offers of the booksellers, to commence the compilation of his Dictionary, but the work did not appear till 1736. He tells us himself, indeed, that it had been begun more than twenty years before. The first edition, which was dedicated to Dr. Mead, in a well-written Latin address, was in one volume quarto; and it was the only one published during the lifetime of the author. Ainsworth died in London, on the 4th of April, 1743, and was buried at Poplar, where an inscription of his own composition was placed over his remains and those of his wife. Having acquired a competency, he had retired from teaching for some time before his death. These particulars are given in a notice prefixed to the second edition of his Dictionary. He is said to have written some Latin poems; and he also published 'Proposals for making Education less Chargeable,' and some other treatises, of which there is a list in Watt's 'Bibliotheca.' A second edition of his Dictionary, edited by Mr. Samuel Patrick, appeared in two volumes quarto, 1746, and it has since been frequently republished, and also abridged. The best edition of the larger work, is that which appeared in 1816, in one volume quarto, under the care of Dr. Carey. This Dictionary was a very creditable work for the time, and it is still used; but something better is now required in the present condition of philology.

AIR. This word, derived from the Greek and Latin, *aër*, is generally applied to the material of our atmosphere, though in the last century it was applied to gases of most kinds as fast as they were discovered. The air which envelops the globe is a *mixture* (not a chemical compound) of oxygen and nitrogen, with a very small proportion of carbonic acid, and water in the state of vapour. The two last are considered as accidental ingredients, and not constituent parts; as well on account of the smallness of their quantity, as because they occur in different proportions at different times. Estimated by weight, air is found (nearly, but not with strict accuracy) to consist of one atom or equivalent of oxygen to two of nitrogen [Atomic Theory]; or, estimated by volume, the oxygen is to the nitrogen in the ratio of one to four. The carbonic acid and

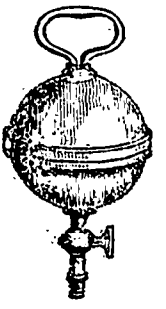
aqueous vapour, taken together, are not more than $\frac{1}{16}$ of the whole weight.

A thousand cubic inches of dry air, the barometer standing at 30 inches, and Fahrenheit's thermometer at 60°, weigh about 310 grains. The same bulk of water, at the same pressure and temperature, weighs 252,525 grains, or more than 800 times that of air.

When air is said to be a *mixture* rather than a *combination* of gases, it is implied that the distinctive properties of the components are not changed. The oxygen and nitrogen still possess their own peculiar properties; but in other chemical bodies, such as nitrous and nitric oxides, and nitrous and nitric acids, formed from a *compound* of oxygen and nitrogen, the properties of both the gases are almost lost, and new properties created. Still the mixture has much permanence of character, for the oxygen and nitrogen are found nearly in the same ratio at all climates and altitudes.

The air, in common with all other bodies, has weight. This is proved by weighing a bottle which contains air in a very delicate balance, and then by repeating the process after the air has been exhausted from the bottle by the air-pump. From this we are immediately led to conclude that, like all other heavy fluids, it exercises pressure upon all substances which are in contact with it,—a truth that was very little suspected in ancient times. Many features of the discovery are noticed under ATMOSPHERE and BAROMETER. The density of the air depends, upon, and is a consequence of, the pressure of the superincumbent atmosphere. For the air is an elastic fluid; that is, its bulk increases, and its density diminishes, whenever the exterior pressure is wholly or partially removed. Let a loose bladder, tied at the mouth, and not so full of air as to be distended, be placed under the receiver of an air-pump, so that the air which presses the outside of the bladder can be exhausted; the interior air will expand so soon as the exhaustion begins, will presently distend the bladder to its fullest dimensions, and in some cases will even burst it. On the re-admission of the air into the space surrounding the bladder, the latter will gradually resume its former dimensions, and its withered or flaccid appearance. As we ascend the atmosphere, the superincumbent column of air becomes of less weight, and the density becomes less; that is, a cubic foot at the height of (say) 1000 feet above the ground is not so heavy, or does not contain so much air, as a cubic foot at the surface of the earth. The pressure and density of the air are regulated by the following law: *at the same temperature*, the elastic forces of two portions of air (or, which is the same thing, the weights of mercury they will balance) are in direct proportion to the densities, or in inverse proportion to the spaces, occupied by these portions.

The very great pressure of the atmosphere is illustrated by the following experiment. Two hollow hemispheres are loosely placed one upon the other, as in the figure: the lower communicates by a tube, in which is a stop-cock (open for the present), with the exhausting apparatus of an air-pump. At present there is no impediment to lifting the upper from the lower except its weight; the pressure of the air from within counterbalancing that from without. But if the air be withdrawn from the interior, and the stop-cock closed so that the apparatus can be unscrewed from the air-pump, without allowing the air to enter, it will require an enormous force to separate the two hemispheres. If the diameter of the circle be 14 inches, the least force that will separate them will be equivalent to about half a ton. The human body would be crushed by the pressure of the air on it, were there not a counter pressure from within.



The temperature of air influences its elastic force. It is probable that air would become first liquid, and then solid, if it could be made sufficiently cold. Like all other substances, air gives out heat when it is compressed; a property strikingly illustrated by the fact that tinder can be set on fire when the air in which it is contained is suddenly and violently compressed.

Air, like gases and vapours generally, enlarges its bulk with every increase of temperature, or increases its elastic force if enlargement of bulk be prevented. The quantity of this expansion, when the temperature passes from the freezing to the boiling point of water (that is, from 32° to 212° of Fahrenheit's thermometer, from 0° to 80° of Réaumur's, and from 0° to 100° of the Centigrade), is 375 parts out of a thousand of the bulk which it had at the freezing point. And this enlargement is uniform: that is, whatever expansion arises from an increase of 12° of temperature, half as much arises from an increase of 6°, twice as much from one of 24°, and so on. From the different systems on which the Fahrenheit, Réaumur, and Centigrade thermometers are graduated, it follows that the increase of bulk, corresponding to a rise of *one* degree of temperature in the air (the bulk of 32° F. being taken as a standard) is equal to $\frac{1}{180}$, $\frac{1}{240}$, $\frac{1}{375}$, respectively. In some few cases this regularity of expansion is not quite certain, but it is known to be very near the truth.

On the properties of air with regard to other bodies, we may notice that probably there is a slight adhesion of air to many, if not to all surfaces. A small needle may be made to swim on water, and in this state the water evidently retires from around it, leaving it, as it were, suspended over a hollow in the fluid. This is attributed to the adhesion of a coat of air, which, with the iron, makes the whole specifically lighter than the water. Recent experiments on the pendulum have led some to suspect, that, in addition to the resistance of the air, a slight coating of this substance travels with the pendulum, and thereby causes an irregular addition to its weight.

In this article we have considered only some of

the chemical and mechanical properties of air. Other details are given under ACOUSTICS, AIR-GUN, AIR-PUMP, AERODYNAMICS, ATMOSPHERE, BALLOON, COMBUSTION, PNEUMATICS, RESPIRATION, VENTILATION.

AIR, or *Melody*, in music, is supposed by some writers to owe the origin of its designation to the perception of a certain resemblance between atmospheric air and melody (or musical air), in the qualities of lightness and buoyancy; atmospheric air occupying the upper place in position, as melody occupies the upper part in music. But whatever be the origin of the name, it is conceived by Rousseau to be applicable to all melodies, to distinguish them from recitative. The usual definition, however, is that an air consists of that succession of single sounds, regulated by the laws of musical rhythm, which constitutes what, in homely language, is called a *tune*. [RHYTHM.]

Air is, confessedly, the most important of the constituents of music; insomuch that Haydn used to say,—'Let your air be good, and your composition, whatever it may be, will possess beauty, and must certainly please.' Air is in music what design and outline are in the sister art of painting; harmony is the filling up and the colouring.

The various kinds of airs, instrumental as well as vocal, are given under their different heads. [ALLEMAND, BARCAROLLE, &c.]

AIR-BED and CUSHIONS. [WATERPROOF COMPOSITIONS.]

AIR-BLADDER, a peculiar organ with which the great majority of fishes are provided, and by which they are enabled to adapt the specific gravity of their bodies to the various pressures of the superincumbent water at different depths. This vessel is composed of a lengthened sack, sometimes simple, as in the common perch, sometimes divided into two or more compartments by a lateral or transverse ligature, as in the trout and salmon, and at other times furnished with appendages, more or less numerous, according to the particular species. In all cases it is composed of a thick internal coat of a fibrous texture, and of a very thin external coat; the whole being enveloped in the general covering of the intestines.

The modifications of this organ are infinitely varied in different genera and species of fishes. In the greater number of instances, it has no external opening, and the air with which it is found distended is believed to be produced by the secretion of a certain glandulous organ, with which it is in all these cases provided. In fresh-water fishes, the air-bladder communicates sometimes with the œsophagus, and sometimes with the stomach, by means of a small tube; and it is observable that, in the greater number of these instances in which it has a direct external communication with the intestines, the secreting glands abovementioned do not exist; thus giving us strong reason to believe that its functions and uses are not uniformly the same in all the different classes of fishes. A very limited number of species, among others the common eel, have air-bladders not only opening by an external duct, but likewise provided with secreting glands; and thus occupying an intermediate station between the two larger classes, at least as far as the nature and functions of this organ are concerned.

In general, all fishes which enjoy great powers of locomotion, and have occasion to pass through various degrees of superincumbent pressure in their rapid transitions from the surface to the bottom of the ocean, are provided with this important organ; and so indispensable is it in their economy, that those which, for the sake of experiment, have been deprived of it, have sunk helpless to the bottom, and there remained incapable of moving, or even of maintaining their equilibrium. But to fishes whose habits and organization confine them either to the surface of the water or to the bottom of the sea, and which, therefore, do not require to pass through different depths, or to encounter different degrees of pressure, the possession of an air-bladder is by no means so essentially requisite. Accordingly we find that all the different species of rays and pleuronectes, or flat fish, such as skates, soles, turbots, brills, &c., which live only upon the coasts and sand-banks at the bottom of the ocean, as well as the mackerel and others which find their food entirely at the surface, have no air-bladder; and so small is the relation of this otherwise important organ to the general conformation of fishes, that we sometimes find it present in one species, and wanting altogether in another of the same genus.

Fishermen are well acquainted with the nature and functions of the air-bladder, or, as they most commonly call it, the *swim*. They are accustomed to perforate this vessel with a fine needle in cod, and other species which require to be brought fresh to market, sometimes from a very great distance. By this operation the confined air is allowed to escape, and the fish constrained to remain quiet at the bottom of their well-boats, where they live for a very considerable period. Cod-sounds, which are brought in great quantities from Newfoundland, are nothing more than the salted air-bladders of these fishes. The Iceland fishermen, as well as those of America, prepare isinglass of a very excellent quality from cod-sounds, though they are not acquainted with the method of clarifying it, which the Russians practise in preparing that article from the sound of the sturgeon. [ISINGLASS.]

AIR-CELLS, in plants, are cavities in the leaves or stems, or other parts, containing air. Their anatomical structure frequently exhibits one of the most beautiful of microscopic objects. In plants which do not float they often appear to be mere lacerations of a mass of cellular substance, and their object is unknown; well-known instances of their presence are the chambers in the pith of the walnut-tree, and the tubular cavities in the stem of the bamboo and other grasses.

AIR-GUN, an instrument for projecting bullets, in which the moving power is the rush of condensed air allowed to escape, instead of the formation of gases arising from the ignition of gunpowder.

In the stock of the air-gun is a condensing syringe, the piston of which condenses air into a cavity having a valve opening inwards, just behind

the bullet. The barrel is open, and the bullet (which should just fit the barrel) is inserted in the usual way. The trigger opens the valve behind the bullet, and permits the rush of the condensed air, which propels the bullet forward. The moment the finger is withdrawn from the trigger, the air closes the valve, and remains, somewhat less condensed than before, for the next discharge.

The same principle has been variously applied. In the magazine air-gun, there is a reservoir of bullets, in a channel under the barrel, one of which is turned in by a cylindrical cock pierced by a tube, which in one position is a continuation of the reservoir of bullets, and in another, of the barrel. Thus by turning the gun upside down, and turning the cock, a bullet falls into it from the reservoir, which, on returning the cock, is of course in the barrel. In some air-guns, the cavity containing the condensed air is a hollow copper ball, which can be screwed on to the gun after condensation. The *Air-Cane* is so called because it is usually in the form of a walking stick. The handle contains the condensed air, and can be unscrewed and filled by a separate condensing syringe.

No power, but only a convenient adaptation of power, is gained in an air-gun; since the condensation of the air requires force. The instrument has hitherto been little more than a toy.

AIR-PLANTS are so called because they possess the power of living for a considerable time if suspended in air, without being in contact with any substance from which they can absorb food.

There are two different tribes to which the name of air-plants has been applied; of which one, containing the moss-like *Tillandsia usneoides*, which hangs in festoons from the branches of trees in the hot, damp forests of tropical America, and the fragrant *T. xiphioides*, which adorns the balconies of the houses in Buenos Ayres, is called by botanists *Bromeliaceæ;* the other, abounding in species of the most different nature and appearance, is named *Orchidaceæ*. It is to the latter, almost exclusively, that the gardener has hitherto turned his attention, and that the following remarks apply.

The application of physiological principles has at length overcome all difficulties to so great a degree, that *orchideous* air-plants have become comparatively common in the hot-houses of the lovers of beautiful flowers.

The native country of these curious plants is wherever a climate is found in which heat and moisture are in excess. Within the tropics in Asia, Africa, and America, in damp and shady forests, by the side of fountains, within reach of the spray of waterfalls, perched upon the branches of trees, or clinging to rocks and stones by means of their long and writhing roots,—creeping among moss, rearing their flowers in the midst of brakes and other moisture-loving tribes,—in all such situations they are found in abundance. But in those regions where the heat is accompanied by periodical dryness, as the open plains of India, and the sandy deserts of Arabia and Africa, they are almost entirely unknown.

Such are the conditions under which air-plants, of the kind now described, naturally thrive; 1, high temperature; 2, diffused light, like that of a shady grove, and not direct solar light; 3, a great degree of dampness; and, 4, a perfect freedom from stagnant water round their roots. And it is to circumstances of this nature that the gardener has chiefly to attend. Damp, shade, heat, and good drainage, will be his objects; the three former will cause him no trouble, but the latter will require him to alter entirely his usual mode of cultivation. Instead of considering in what kind of soil his air-plants are to be placed, he will endeavour to dispense with soil, and to supply its place with bits of rotten wood, chopped moss in very small quantities, fragments of half-baked pottery, such as garden-pots and the like.

These are the points which enable modern gardeners to obtain a degree of success. Equal at least in importance to all of them is a circumstance of which they are only just beginning to be aware, namely, that air-plants and all other tropical plants require a season of repose and cessation from vigorous growth. It is true that in equatorial regions there is neither frost nor snow, and that in many climates there is no cold season—but it does not, therefore, follow that plants have no season of repose. The fact is, that within the tropics, or in those latitudes where frost and snow and periodical cold are unknown, the season of rest is the *dry* season.

This it is to which the gardener should attend; it is this which explains the difference between the success of one cultivator and another; and it is to a knowledge of this, taken in conjunction with the circumstances before explained, that we owe the remarkable improvement that has taken place in the mode of cultivating these plants in Great Britain.

For further information upon this subject, see Dr. Lindley's *Observations in the Transactions of the Horticultural Society*, vol. i., New Series, p. 42, and the latter volumes of the *Botanical Register*. [ORCHIDACEÆ.]

AIR-PUMP, a philosophical instrument for removing the air out of a vessel. We shall also in-

fig. 1.

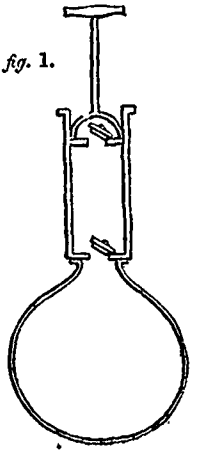
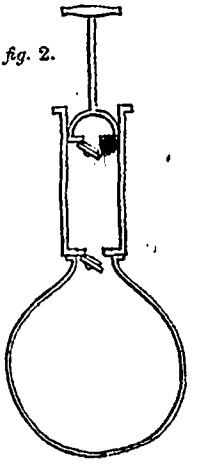


fig. 2.

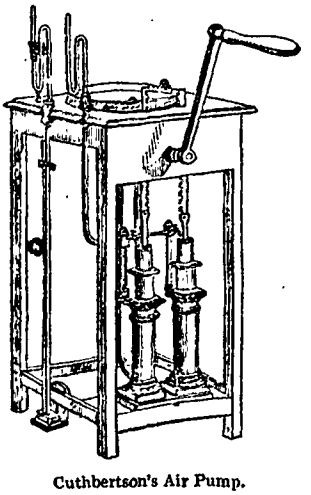


clude under this head the apparatus for forcing more air into a vessel, better known by the name of the Condensing Syringe, as the two differ very slightly in their main principle and simplest construction.

The figures given above are sections of the simplest forms of an *exhausting syringe* and of a *condensing syringe*. Both consist of a tube closed at one end, excepting an orifice to which a valve or lid is attached. A piston, with a rod and handle, enters at the other end, and can be moved up and down the tube. The piston is not entirely closed, but has a valve opening the same way as the other valve. Both are attached to vessels, the air of which is to be rarefied or condensed. In fig. 1, or the exhausting syringe, both valves open upwards; or let air only *out* of the vessel and the piston: in fig. 2, or the condensing syringe, both open downwards, or let air only *into* the vessel and the piston.

In fig. 1, or the exhausting syringe, every time that the piston is drawn *upwards*, it leaves a sort of vacuum in the barrel; and the air in the receiver forces up the lower valve, to fill up this vacuum. At the next movement, the air thus raised is driven out of the instrument altogether; for the valves are so placed that no air can go from above downwards. By repeated movements of this kind, nearly all the air may be drawn out of the receiver. In fig. 2, or the condensing syringe, all the operations are exactly reversed; the *downward* motion of the piston being the efficient agent in forcing into the receiver a quantity of air many times greater than that which it originally contained.

The exhausting syringe is, in principle, the common air-pump. The form of air-pump known as Cuthbertson's is here represented, and the details are thus arranged:—at the top is a metal plate ground to a perfect plane surface, on which



Cuthbertson's Air Pump.

is placed an inverted glass jar or receiver, whence the air is to be extracted. A hole in the plate is connected with a tube, which communicates with two pump barrels. These barrels are exhausting syringes. One or more gauges are attached to the instrument to test the degree of exhaustion of the air.

The pistons which work in the two pump-barrels are connected by a rack and pinion movement with a handle, in such a way that when the handle is worked in semi-circular movements, the pistons are raised alternately. As the lower part of each barrel is connected with the receiver by means of the tube, the movements of the two pistons gradually draw out the air from the receiver, in the manner of the exhausting syringe; and in this way a nearly perfect vacuum may be produced.

In most of the objects for which an air-pump is required, a glass receiver, provided with stop-cocks or other adjustments, is placed on the plate of the air-pump to have the air extracted; and experiments or observations are made in the vacuum thus produced.

The following experiments are among the most common of those shown with the air-pump:—

1. If the receiver be open at both ends, and the upper orifice be stopped by the hand,—on exhaustion, the pressure of the exterior air will prevent the removal of the hand. If a piece of bladder be tied tightly over the orifice, as the exhaustion proceeds, the bladder will be pressed inwards, and will finally burst with a loud noise. The pressure of the air is also proved by the experiment of the hemispheres, described in the article AIR.

2. The weight of the air is proved by exhausting a copper ball furnished with a stop-cock, which is shut before the ball is removed from the air-pump. It will then be found to weigh less than before the exhaustion was made.

3. The presence of air in various substances may be detected. A glass of liquid placed under the receiver will give out bubbles of air as soon as the exhaustion begins. A shrivelled apple will be restored to apparent freshness by the expansion of the air which it contains; but will resume its original appearance when the air is allowed to return.

4. The elasticity of air may be shown by placing a bladder under the receiver, not distended, and the mouth of which is tied up. On exhausting the receiver, the air contained in the bladder will expand it more and more, as more of the pressure from the exterior is removed; and the bladder will finally burst from the interior pressure. If a hole be made in the smaller end of an egg, which is placed under the receiver, the small bubble of air, which is always found in the larger end, will by its expansion force out the contents of the egg.

Torricelli [BAROMETER] produced the first vacuum; but Otto von Guericke made the first air-pump, in 1654; and after his time, Boyle, Hawksbee, Gravesande, and others gradually improved it.

AIR-VESSELS, in plants, are what botanists call spiral vessels. It is supposed by some that these are the only parts through which air is conveyed into the vegetable system; and it has been proved that, in some cases at least, the air that

they contain consists of a larger proportion of oxygen than atmospheric air. But it is doubtful whether the action of these vessels is more than local, and it is certain that air has tolerably free access to many parts, as the leaves, for example, by means entirely independent of the spiral vessels. [TISSUES, VEGETABLE.]

AIR-VESSELS, or *Air-Chambers*, are used in various machines, either to regulate and equalize the propulsion of fluids, as in a FIRE-ENGINE; or to regulate and check the velocity of apparatus which might otherwise attain a dangerous degree of speed. An example of the last-mentioned use is afforded by the contrivance employed by Mr. Timothy Bramah, instead of a fly, to regulate the speed of a tread-mill. In this contrivance the turning of the tread-wheel is made to work a series of large bellows, or air-vessels resembling bellows, in which the apertures for the ingress and egress of air are fitted with sliding plates worked by an apparatus resembling the governor of a steam-engine; so that whenever the speed of the machinery exceeds the desired limit, the apertures are reduced, and a greater resistance is thereby occasioned. Similar contrivances, in which a cylinder and piston may be used instead of bellows, and water or oil instead of air, may be advantageously employed in lieu of ordinary breaks for cranes used in lowering heavy goods, and in various other machines.

AIRE. [PAS-DE-CALAIS.]

AIRE. [LANDES.]

AIRE. [YORKSHIRE.]

AIRE AND CALDER NAVIGATION. [YORKSHIRE.]

AISLE, or AILE, from the Latin *ala*, and the French *aile*, a wing. In French this term is applied to the outlying and returning ends of a building, which we distinguish by its English equivalent, *wing*; such are the columned ends of the front of the Post Office, and the advanced flanks of the Buckingham Palace, in London. We apply the term aisle to the lateral divisions or passages of the interior of a church,—those parts which lie between the flank walls and the piers, pillars, or columns, which flank the nave, or grand central division,—when the structure is so arranged.

AISNE, a department of France, formed out of portions of Picardy, Champagne, and Isle de France, is bounded N. by the department of Nord, E. by that of Ardennes, S.E. by that of Marne, S.W. by that of Seine et Marne, and W. by those of Oise and Somme. It lies between 48° 50′ and 50° 4′ N. lat., and between 2° 56′ and 4° 12′ E. long. Its greatest length is 84 miles from N. to S., and its greatest breadth from E. to W. is 52 miles. The area of the department is 2,818 square miles; the population in 1841 was 542,213, which gives an average of 192.7 to the square mile, or 24.69 above the average per square mile for all France.

The department consists of undulating plains, which are interrupted to the northward by hills and valleys: the central and southern parts are crossed by chains of hills extending from E. to W. The soil is calcareous. In the N.E. chalk abounds with a mixture of clayslate; in the S. mill-stone-grit, and plaster of Paris are met with. Iron ore, coal, peat, building stone, slate, flint, and potter's clay are found. The high plains are very fertile, the low grounds of the department are mostly wet and cold. Corn of all kinds, wine, hemp, flax, oil from beech mast, cider, and vegetables, are the chief agricultural products. Horses, mules, asses, sheep, and horned cattle of an inferior breed are reared in great numbers. Its manufactures of lawn, linen, silk, calico, paper, leather, soap, glass, porcelain, and iron, distinguish it as one of the most industrious districts in France. The climate is generally good; but in some parts fogs are frequent.

The river Aisne, which gives name to the department, rises in the Argonne hills, in the department of Meuse, crosses those of Marne, Ardennes, and Aisne, passing Sainte Menehould, Vouzier, Rethel, and Soissons, and falls into the Oise about a mile and a half to N.E. of Compiègne, having run in a direction generally from E. to W. a course of 151 miles, of which the last 80 miles from Château-Porcien are navigable, and nearly 40 miles more above Château-Porcien are available for floating timber from the forests of Ardennes. Its feeders on the right are the Aire and the Vaux; on the left, the Suippe, the Vèle and the Retourne, which are also available for purposes of floatage. The Sambre, the Scheldt (*l'Escaut*), and the Somme take their rise in the north of the department: the Oise crosses it from N.E. to W. passing Guise and La Fère, and is navigable from Chauny, but is used for purposes of floatage almost from its source in Ardennes. The Oureq rises in the south of the department, which it crosses from E. to W. on its way to join the Marne. The Marne also crosses the south of the department, passing through Château-Thierry, and is navigable.

The department is traversed by several excellent roads, among others by those leading from Paris to Lille and Mons. Besides its rivers and its roads, the department has means of communication with Belgium and the sea by the canals of St. Quentin and the Somme. The canal of St. Quentin commences at Cambrai on the Scheldt and ends at Chauny on the Oise, thus uniting these two rivers. Its whole length is 58 miles: there are thirty-six locks, and two tunnels, one of which, near Castelet, exceeds 3½ miles in length; the other is near St. Quentin, and about three quarters of a mile long. The southern part of this canal, from St. Quentin to Chauny, which is sometimes called the Canal of Crozat, is nearly 26 miles long. The Canal of the Somme joins that of St. Quentin a little east of Ham, and ends at St. Valery-sur-Somme, thus establishing a communication between the department and the sea.

The area of the department is 1,800,304 acres, of which 1,294,390 are arable: there are 98,840 acres of natural grass land or downs, on which 350,000 merino sheep are grazed; 24,600 acres are under vines; 284,181 under woods and forests, and 7,166 of ponds and marshes.

The department is divided into five arrondissements, which, with the number of cantons, communes and population in each, are as follows:—

Arrond. ..	Cantons.	Communes.	Pop. in 1841.
Laon	11	293	168,554
Soissons . . .	6	169	72,038
St. Quentin . .	7	130	120,534
Vervins . . .	8	134	117,622
Château-Thierry .	5	132	63,465
Total . .	37	858	542,213

In the arrondissement of Laon the chief town is Laon, which is also the capital of the department. It stands in 49° 33′ N. lat., 3° 37′ E. long., at a distance of 79 miles N.E. of Paris, and has a population of 9400. The town is built on a hill in the centre of a large fertile plain; the streets are narrow but well built. The only remarkable building is the cathedral, which is in the Gothic style, of vast size, and surmounted by four lofty towers. There is a tribunal of first instance, a college, school of design, courses of science and of science applied to the arts, a public library containing 12,000 volumes, a theatre, and several charitable institutions. The chief business of the town is in agricultural produce; there are some tanyards and potteries in the faubourgs. The other towns are—La Fère, a fortified town on the Oise, famous for its school of artillery and arsenal: Chauny, from its situation on the Oise and the Canal of St. Quentin, is a place of commercial activity; its chief fabrics are leather, hosiery, and linen; the mirrors of St. Gobain are polished here by a hydraulic engine: Coucy-le-Château: Craone: Marle, which has a good corn market and several tanyards: Rosay: Sissonne: Premontré, in the old abbey of which a large glass factory has been established: Folembray, where upwards of 3,000,000 glass bottles are made every year: and St. Gobain, famous for its manufacture of glass mirrors, one of which, exhibited in 1834, measured 163 inches in length and 96 inches in breadth.

In the arrondissement of Soissons, the chief town is Soissons, a city rich in historical associations; population 8000; it stands on the Aisne, is fortified, and is the seat of a bishop. There is a tribunal of first instance, a college, an agricultural society, and a public library containing 18,000 volumes. There are several fine churches in the town, of which that of St. Gervais is famous for its vast size. There is a brisk trade in corn, flour, vegetables, and wood, for the supply of Paris; coarse linen, tapestry and leather, are the chief fabrics. The other towns are—Vailly on the Aisne, near which are mineral springs: Braine: Oulchy-le-Chateau: Villers-Coterets, population 2500, on the edge of the forest of Villers-Coterets; there is in the town an old castle, built in the time of Francis I., which was formerly converted into a poor-house, and is now used as a barrack.

In the arrondissement of St. Quentin, the chief town is St. Quentin, 49° 50′ N. lat., 3° 17′ E. long., 25 miles N.W. of Laon, and 44 miles E. of Amiens. The town stands on a hill on the right bank of the Somme, and on the canal to which it gives name; the principal streets abut in a large square, which occupies the summit of the hill, and one side of which is formed by the Hotel de Ville, a fine old gothic building; close to this square stands the ancient gothic cathedral, remarkable for its lofty bell-tower, which can be seen from Laon in clear weather. The old ramparts have been levelled, planted with trees, and converted into promenades. The population is 25,000: the town is the seat of tribunals of first instance and of commerce, and has a college, schools of design and of commerce, scientific, literary and agricultural societies. The supply of water is by means of Artesian wells, of which there are several. This important and flourishing town has manufactures of silk, cachemire shawls, lawn, linen, lace, calico, gauze, muslin, &c. There are also establishments for bleaching, and for cotton printing and dyeing. Above 100,000 individuals are employed in weaving, spinning, and the auxiliary processes, in the district of which St. Quentin is the centre. The other towns are—Le Catelet: Moy: Ribemont, the birth-place of Condorcet, on the Oise: St. Simon, on the Crozat canal; and Vermand.

In the arrondissement of Vervins, the chief town is Vervins, an old and well-built town; it is the seat of tribunals of first instance and of commerce, and has a college and an hospital; oil, felt hats, leather and paper are made; population 2,900. The other towns are—Aubenton: Guise, on the Oise, which has some fabrics of cloth, linen, cotton, leather, hemp, and linen thread; there are flint quarries near the town: Hirson, also on the Oise, which is a place of some manufacturing industry: Nouvionen-Thiérache, of which gauze, muslin, calico, cotton and woollen yarn, and drinking glasses, are the chief fabrics; in the environs are some very fine pasture lands and a forest: Sains, Wasigny, and La Capelle.

In the arrondissement of Château-Thierry, the chief town is Château-Thierry, the birthplace of La Fontaine, population 4697; it stands on the Marne, has a tribunal of first instance, a college and public library; linen, cotton, pottery and leather are its chief fabrics; it trades in corn, wool, cattle, and wine. The other towns are—La Ferté Milon, the birthplace of Racine; it stands on the Ourcq, is walled, and was formerly defended by a strong castle, which is now in ruins: Charly: Fère-en-Tardenois, which has potteries, and trades in corn, hemp, wool, wood and wine: and Neuilly St. Front, where great numbers of hats are made.

The department returns six members to the Chamber of Deputies, forms the diocese of Soissons, belongs to the jurisdiction of the Cour Royal and of the University Academy of Amiens, and is included in the first military division, of which Paris is the head-quarters.

AISNE, River. [Aisne, Department.]

AIX, a considerable town of France, in the department of the Bouches du Rhone (mouths of the Rhone), situated just to the north of the river Arc, in a plain surrounded with hills which produce good oil, wine, and fruit. The town owes its origin and its name to the Romans; for the proconsul, C. Sextius Calvinus, having defeated

the Salluvii, a Gallic tribe, founded a colony here about B.C. 120, and gave it, on account of its medicinal springs, the name of Aquæ Sextiæ (the waters of Sextius)—whence the name of Aix. The water is clear, light, and moderately warm, without much taste or smell, and is now in small repute for its virtues. In the middle ages, this town was the residence of the Counts of Provence. It still retains a part of its old wall and gates.

Aix is a handsome town; the streets are straight and well paved and lighted; and the public buildings handsome. Among them are the cathedral of St. Sauveur, parts of which are very ancient, there being a wall of Roman masonry, and it contains some good pictures; the Palais; the Museum; three fountains in the street called the *Cours*, on one of which is a statue, by David, of René, king of Provence; and the public library. Aix is the seat of an archbishopric, of a cour royale, and of some other public boards.

The population of Aix amounts to 23,000 persons, who carry on a considerable trade in hardwares, fish, and the productions of the neighbouring country. Among the manufactures are silks, velvets, woollen cloth, and printed calicoes.

Aix is in 43° 32′ N. lat., and 5° 27′ E. long. It is 478 miles S.S.E. of Paris, and 19 N. of Marseilles.

AIX, a small town of Savoy, of about 2000 inhabitants. It owes its present importance to two hot springs which annually attract a great number of visitors. Their temperature is from 112° to 117° Fahrenheit. In the time of the Romans it was called Aquæ Allóbrogum, and Aquæ Gratianæ or Domitianæ. The town stands in a pleasant and healthy valley, on the east side of the Lake Bourget, and at an elevation of 823 English feet above the level of the sea. It is 7 miles N. by E. of Chambéry, the capital of Savoy.

AIX-LA-CHAPELLE, called by the Germans AACHEN, is a governmental district in the Prussian province of the Rhine, and contains the circles of Aix-la-Chapelle, town and country, Geilenkirchen, Heinsberg, Erkelenz, Jülich, Düren, Eupen, Montjoie, Schleiden, and Malmedy, with a total population of 354,472, on an area of about 1600 square miles. It is bounded on the east by the other Prussian districts of Düsseldorf, Cologne, and Coblenz; on the west and north-west by the Belgian province of Liège and the Netherlands; and on the south-west by Luxemburg. The principal river is the Roer, or Ruhr, which runs nearly through the district, and falls into the Maas near Ruremond. The northern part of the district is fertile and populous; the southern is bare and hilly, and less populous, but has mines of iron, lead, and coal, and lime-quarries.

AIX-LA-CHAPELLE, or AACHEN, is the chief city of the district of Aix-la-Chapelle. It stands in 50° 47′ N. lat., 6° 3′ E. long., and 75 miles E. by S. from Brussels. The situation of the city is agreeable: it stands on uneven ground, surrounded by hills of moderate elevation, generally covered with wood. The city is the see of a bishop, and the seat of the courts of law, the chamber of commerce, and the custom-house of the district. There are many public buildings in the city deserving of notice, either for their antiquity or beauty. The old ramparts have been formed into promenades. The town-house is an old building in the Gothic style. The minster, which is said to have been commenced by Charlemagne, contains the tomb of this monarch, a great number of relics, and doors of bronze. There is a handsome theatre at Aix-la-Chapelle, a public library of 10,000 volumes, a gymnasium, three hospitals, and other charitable foundations.

Aix-la-Chapelle, though not as important as it once was, is still a considerable place, with about 40,000 inhabitants. It has various manufactures, of which the chief are, however, woollen cloths, needles, and pins. Its manufactures have been promoted by the coal which is found and worked near the town. The needles of Aix-la-Chapelle are said by the Germans to be equal to those of England for fineness and polish: the steel wire of which they are made is chiefly brought from Altona. Pin-making, in imitation of the English manufacture, was introduced from Upper Alsace. Aix is now a principal station of the Belgian Rhenish railway, which will materially add to its commercial facilities.

The foundation of the first known town on this spot is generally assigned to Severus Granius, a commander among the Belgæ, under Hadrian, about A.D. 125. The remains found in modern times undoubtedly show that it was known to the Romans. Charlemagne is said to have resided there regularly after 768, whenever he was not engaged in war. He built a palace, a town-house, a part of the present cathedral, and fitted up several baths. In the market-place is a fine spring, and a gilded bronze statue of the great emperor, who did so much to beautify this place of his favourite residence. The fountain has a bronze basin twenty-four feet in circumference.

In 882 the Normans ravaged the city. From 1794 to 1814 it belonged to France, during which time it was the capital of the department of the Roer.

Aix-la-Chapelle still attracts many visitors to its mineral waters. The word *Chapelle*, signifying chapel or church, has reference, it is supposed, to the cathedral which Charlemagne commenced in 773. The hot springs have a temperature of about 143° Fahrenheit, and contain a large portion of sulphur: eight bathing-houses are provided for the accommodation of strangers. That called the Emperor's spring is the one most strongly impregnated with sulphur, and used by invalids. These waters, like others of the same kind, are used for bathing in, and are also drunk by invalids. (Monheim and Reumond, 'Analyse des Eaux Sulphureuses d'Aix-la-Chapelle,' 1810.)

About 500 paces east of Aix-la-Chapelle, on the slope of a small hill, is the little town of Burtscheid, with near 5000 inhabitants. It contains both hot and cold springs without any sulphur in them. The two hot springs have respectively a temperature of 158° and 127° of

Fahrenheit's scale. The higher springs send forth such a copious stream of water, that they form a considerable brook, called the Wurm Brook, which, passing through Aix, falls into the Ruhr.

(Cannabich's *Geographie;* Ersch and Gruber; Möller's *Geographisch-statistisches Handwörterbuch*, 1840.)

Aix-la-Chapelle has an historical celebrity, as the place of concluding some important treaties, which bear its name. The first is that of 1668, between France and Spain, which terminated the war respecting the possession of the Spanish Netherlands (now BELGIUM), by which France gained and has retained Lille, Armentières, &c. The second was that of 1748, between England, France, Holland, Austria, Spain, Sardinia, and Modena, and terminated the war respecting the succession of Maria Theresa to the empire. The last was the Congress of 1818, which regulated the affairs of Europe, after the restoration of the Bourbons in France.

AIZA'NI or AZA'NI, or according to its modern name, Tchafter-Hissar, a city of Asia Minor, in the ancient province of Phrygia, about nine hours' journey from Kutahia. It is mentioned by Strabo as one of the places of Phrygia Epictétus. Nothing is known of its history, and its existence had been almost forgotten until recently, but, owing to its having been visited by travellers and artists, the numerous remains of extensive edifices have given it an archæological interest. Lord St. Asaph was the first who communicated any intelligence respecting these ruins (1825), which were visited about the same time by Count de Laborde, and somewhat later by Major Keppel; but it is to Charles Texier, the architect, who, just after completing his studies in Italy, was sent out by the French government to Asia Minor, about 1834, that we are indebted for an accurate artistical description of them.

The first building that attracts notice on approaching the place is a temple, which, being raised on a considerable eminence, forms, like the Parthenon of Athens, a conspicuous object from a distance, and commands the rest of the town. The eminence upon which this temple at Aizani stands, forms an elevated platform or terrace cut out of the hill. The temple, which appears from inscriptions found among the ruins to have been dedicated to Jupiter of Aizani, is now more than half destroyed, little more remaining than the columns of the north and west sides and the corresponding portions of the cella. We may briefly describe it technically as being Ionic, octastyle, pseudodipteral with fifteen columns on its flanks. Its general dimensions, including the broad socle on which it is raised, are 121 by 72 feet. The whole is constructed of white marble, and the columns, 31 feet high, are each of them wrought out of a single block. Taken altogether this specimen of the Ionic style is an interesting and valuable acquisition to our studies of the ancient orders.

After this temple the chief other monuments discovered at Aizani are a theatre, stadium, and gymnasium. The river Rhyndacus, which passed through the city, was crossed by two bridges of white marble, each consisting of five semicircular arches. Both are remaining, as also the parapets of the quays along the river, which, like the bridges, are constructed of white marble and ornamented with sculptures. There are besides many tombs, whose doors and portals (represented in Texier's work) afford valuable architectural hints and studies.

AJA'CCIO, the chief town of the island of Corsica (or Corse, as it is called by the French), and the capital of the department of Corse, is situated on the north coast of the Gulf of Ajaccio, in 41° 55′ N. lat., 8° 48′ E. long. It is sheltered by high mountains on the north and east. The port is spacious and commodious. The town consists of two broad streets intersecting each other at right angles, and other inferior streets and lanes which are very narrow and dirty. It contains a college, a library of about 12,000 volumes, a botanical garden, and an agricultural society. The population in 1841 was 9834 for the commune, and 51,040 for the arrondissement. Napoleon Bonaparte was born here Aug. 15, 1769. Ajaccio is a bishop's see, and has a cathedral. The climate is extremely mild in winter, and hot and dry in summer. The trade of Ajaccio is in oil and wine; and it also carries on a coral fishery about the straits of Bonifacio, and on the north coast of Africa.

AJAN, the name by which an almost unknown tract of the coast of east Africa is designated. It extends from near Magadoxo, which is included within the limits of Zanguebar, northwards to Cape Guardafui, a distance which may be roughly estimated at about eight degrees of latitude. The southern coast is sandy, barren, and low; but the northern is higher about Cape Delaqua and Cape d'Orfui. Between these two capes there is a deep bay. D'Orfui has a 'bluff point towards the sea, and is backed by lofty and singular-shaped mountains.' (Salt.) It is in 10° 30′ N. lat., 51° 12′ E. long. Cape Guardafui, the most eastern part of Africa, is also a bold promontory with high mountains in the background; it is in 11° 50′ N. lat., 51° 22′ E. long. No great river is described as entering the sea on the coast of Ajan. The neighbourhood of d'Orfui is inhabited by a tribe of Somaulis.

The name Azania, which occurs in the 'Periplus of the Erythrean Sea,' comprehends not only the modern Ajan, but the coast of Zanguebar as far as Quiloa, provided this place be the Rhapta of the 'Periplus.'

(Salt's *Abyssinia;* Vincent's *Periplus.*)

AJAX, son of Télamon, and third in direct male descent from Jupiter, was one of the most renowned heroes of the Trojan war. According to Homer and Pindar, he was next in warlike prowess to Achilles. He is said by later poets to have been invulnerable: but as in the case of Achilles, this story is not found in Homer. It is fully told by Pindar. ('Isthm.' 6.) Telamon, being banished from Ægina by his father Æacus, for killing his brother Phocus, retired to the island of Salamis, and was chosen king. During his father's life, Ajax led the forces of Salamis to Troy, in

conjunction with the Athenians: unless we admit the story that Pisistratus, in order to strengthen the claims of Athens to the possession of the island, interpolated the line of the second book of the 'Iliad' (558), which says that Ajax placed his ships alongside of the Athenians. His chief exploits, recorded in the 'Iliad,' are his duel with Hector, in the 7th book, when the Trojan prince challenged any of the Greek army to single combat (Shakspere, 'Troilus and Cressida'), and his obstinate defence of the ships, in the protracted battle described in the 13th, 14th, 15th, 16th, and 17th books. In the funeral games of Patroclus he contended for three prizes; in wrestling with Ulysses, single combat with Diomédes, and throwing the quoit; but without obtaining the prize in any. After Achilles' death, the armour of that hero was to be given as a prize to him who had deserved best of the Greeks. Ajax and Ulysses alone advanced their claims; but the assembled princes awarded the splendid prize to Ulysses. Ajax was so much mortified at this, that he went mad, and in his fury attacked the herds and flocks of the camp, mistaking them for the Grecian leaders, by whom he thought himself injured. On recovering his senses, he slew himself. This catastrophe is the subject of that noble tragedy of Sophocles, 'Ajax the Scourge-bearer,' so named because the hero is described as cruelly scourging a ram, which he mistakes for Ulysses, before putting him to death. The rivalry of the chiefs is related at length in the 14th book of Ovid's 'Metamorphoses.' Allusion is also made to it in the xith Odyssey. The Greeks honoured him with a splendid funeral, and raised a vast tumulus on the promontory of Rhœteum, corresponding in position with that of Achilles, on the opposite promontory of Sigeum. He left a son named Eurýsaces, who succeeded Telamon on the throne of Salamis. The Æacidæ, or descendants of Æacus, were held in high reverence as demigods in Attica. One of the tribes was named Aiantis, after Ajax; who, in conjunction with Telamon, and other heroes of the race, was solemnly invoked to the assistance of the Athenians before the battle of Salamis; and they were believed to have obeyed the call. (Herod. viii. 64, 65.)

AJAX, son of Oïleus, another distinguished leader in the Trojan war, remarkable for swiftness of foot, and skill in using the bow and javelin. He fills a less important part in the 'Iliad' than his namesake, though he is distinguished by his defence of the ships in company with Ajax, son of Telamon. His notoriety is chiefly derived from events subsequent to the close of the 'Iliad.' At the sack of Troy he offered violence to Cassandra in the temple of Pallas. Indignant at the profanation, the goddess raised a tempest, which wrecked his vessel on its voyage home, and many others of the Grecian fleet. Ajax escaped to a rock, and might have been preserved, but that he blasphemously defied the gods, and said he would escape in spite of them: whereupon Neptune cleft the rock with his trident, and tumbled him into the sea, where he perished. ('Odyssey,' iv. 502.) Virgil relates his death differently. ('Æneid,' i. 39.)

AJMEER. [RAJPOOTANA.]

AKBAR (i. e. *the Great*), the son of the Mogol Emperor Humayun, was born on the 14th of October, 1542, at Amerkote, in the great sandy desert east of the Indus; and, on the death of his father, succeeded him in the government of Delhi, in the fourteenth year of his age (Feb. 15, 1556). From this time till his death in 1605, he was almost continually occupied with enemies abroad or in repressing revolutionary movements at home, the details of which are little more than a repetition of battles and military operations, united to what is too common in oriental history, namely family dissensions, several of the rebellions having been headed by his brothers and his sons. Akbar, nevertheless, found time to cultivate the arts of peace, and devoted his attention, with the utmost anxiety, to whatever appeared calculated to promote the happiness of his empire. The mildness of his character, his strict impartiality to the different classes of his subjects, the magnanimity which he showed to his enemies, and his great personal courage, are mentioned with praise even by the Jesuits who visited India during his reign; and the memory of his many amiable virtues still survives among the Hindu as well as the Mohammedan population of India. He encouraged trade and commerce, reduced taxation, and kept a strict watch over the conduct of the officers of his government. But what still more distinguished him was his spirit of toleration, a virtue seldom possessed by Mohammedan sovereigns, which led him to show the same benevolent attention to the interests of all his subjects, whether they professed his own or the Hindu religion. In his endeavours to advance the prosperity of his empire, Akbar was powerfully assisted by his celebrated vizir Abul Fazl [ABUL FAZL], who besides a memoir of Akbar's reign, wrote an excellent statistical and political account of the state of the Mogol empire during his administration, which is one of the most remarkable works in oriental literature relative to India. [AYIN-I-AKBARI.]

AKENSIDE, MARK, a poet of considerable reputation in the last century. He was the son of a butcher, at Newcastle-upon-Tyne, and born November 9, 1721. His parents were Presbyterians, and intended to bring him up as a minister of that persuasion. With this view they sent him, in 1739, to the University of Edinburgh; but he soon turned his attention to the study of medicine, and after remaining three years in the Scottish capital went to Leyden, where he finished his education, and took the degree of M.D. in 1744. It should be mentioned to his honour, that having been assisted while he was destined for the ministry, from certain funds set apart by the English dissenters for the education of their clergy, he repaid in after life the money which had been thus bestowed upon him. His principal poetical work, the only one by which he is now much known, the 'Pleasures of Imagination,' appeared in 1744. Having finally settled in London he acquired professional honours, but never obtained any large share of practice. He died June 23, 1770, aged forty-nine.

The 'Pleasures of Imagination' is written in

blank verse, with much power of versification and splendour of language. The subject and design of it cannot be more briefly given than in the author's language; it is to give a view of the various pleasures founded on the exercise of the imaginative powers, 'so that, whatever our imagination feels from the agreeable appearances of nature, and all the various attainments we meet with, either in poetry, painting, music, or any of the elegant arts, might be deducible from one or other of those principles in the constitution of the human mind, which are here established and explained.'

AKERBLAD, JOHN DAVID, a Swedish scholar who distinguished himself by his researches in Runic, Phœnician, Coptic, and Hieroglyphic literature. Having travelled over several countries of the East, he spent his last days in Rome, where he was supported by the bounty of the Duchess of Devonshire and other admirers of his talents, and died in that city at an early age, in 1819.

AKERMAN, called *Julia Alba* by the Romans, a fortified town in the Russian province of Bessarabia, is situated near the outlet of the Dniester into the Black Sea, 46° 9′ N. lat., 30° 13′ E. long.

The town stands on a point of land which projects into the gulf of the Dniester, and is defended on the land side by deep ditches, and in the parts bordering on the gulf by a thick wall. The town and port, which is a good one, are commanded by a castle on an eminence. The inhabitants, about 15,000, chiefly consist of Greeks, Armenians, and Jews. Fish, which is caught in abundance in the gulf of the Dniester, and salt from the salt lakes of the district of Akerman, form the principal articles of commerce. Akerman contains a handsome Armenian church, with some mosques and Greek churches. The streets are dirty and the town ill-built.

By the treaty of Akerman, concluded in September, 1826, between Russia and Turkey, the provinces of Moldavia, Wallachia, and Servia, may be regarded as having been released from all but a nominal dependence on the Porte, and made over to the protection, if not to the sovereignty, of Russia.

ALABA'MA, one of the southern United States of North America, is bounded on the north by Tennessee, on the east by Georgia, on the south by Florida and the Gulf of Mexico, and on the west by Mississippi. It lies between 30° 10′ and 35° N. lat., and between 85° and 88° 30′ W. long. It is 317 miles long from N. to S., and 174 wide from E. to W. The area is 46,000 square miles. The population in 1830 was 308,997; in 1840 it was 590,756, of whom 253,532 were slaves.

Surface and Products.—Alabama has a short coast-line, including the Bay of Mobile, of about 60 miles. The Alleghany mountains terminate in elevated hills in the north-east part of Alabama; in the north, generally, the surface is broken and mountainous; in the middle it is hilly, with tracts of prairie land; in the south, from the Gulf of Mexico to 50 or 60 miles inland, it is low and level. The soil is generally excellent, except in the south, where it is sandy and barren; it rests on limestone, which frequently appears at the surface, and readily decomposes. The forest trees in the middle and north of the state, are post oak, white oak, black oak, hickory, poplar, cedar, pine, chestnut, and mulberry; in the south, pine, cypress, and loblolly. The climate is mild in winter, the rivers being seldom frozen; and the summer heat is tempered by refreshing breezes from the Gulf of Mexico. The low lands of the south, and near the muscle shoals of the Tennessee, are unhealthy, but the rest of the country is salubrious. Iron ore is found in various parts of the state, and coal is abundant on the Black Warrior river and the Cahawba river. Cotton is the staple production of the state, but Indian corn, rice, wheat, oats, &c., are produced.

Rivers.—The principal river of Alabama is the Mobile, which is formed by the junction of the Alabama and the Tombigbee, 40 miles above the city of Mobile. The Alabama is a large river, and is navigable for vessels drawing six feet water, 60 miles above its junction with the Tombigbee, to Claiborne, and has four or five feet water for 150 miles farther, to the mouth of the Cahawba; thence to the junction of the Coosa and Tallapoosa, of which it is formed, it has three feet water in the shallowest places. The Tombigbee is navigable for small sailing vessels to St. Stephens, 150 miles, and for steam-boats to Columbus in Mississippi State; its total length is 450 miles, and it is navigable for boats nearly the whole length. Its course is generally south, and it empties itself into Mobile Bay. The Tennessee flows through the northern part of the state. [TENNESSEE.] The Tuscaloosa, or Black Warrior, is a large branch or affluent of the Tombigbee, and is navigable to the town of Tuscaloosa. The Chatahoochee forms a part of the eastern boundary of the state.

Canals and Railroads.—The Muscle-Shoals canal extends from the head of the falls in the Tennessee to Florence, 36 miles. The Huntsville canal extends from Triena on the Tennessee, to Huntsville, 16 miles. The Alabama and Florida railroad extends from Pensacola to Montgomery, 156½ miles. The Selma and Cahawba railroad, which is a branch of the Alabama and Florida, extends from Selma to Cahawba, 10 miles. The Montgomery and Westpoint railroad extends from Montgomery to Westpoint, 87 miles. The Tuscumbia and Decatur railroad extends from Tuscumbia to Decatur, 44 miles. The Wetumpka railroad (yet incomplete, Feb. 1847), is designed to connect the Tennessee and Alabama rivers.

Manufactures, Trade, and Commerce.—In 1840 the home manufactures of Alabama amounted to 1,656,119 dollars. There were 142 tanneries and 137 manufactories of leather as saddles, &c. There were only 14 cotton manufactories, employing 82 persons. Cast iron, hardware, and cutlery, were produced to a considerable amount; and there were 188 distilleries, which produced 127,230 gallons of spirits. There were 22 printing offices, 3 daily newspapers, 1 semi-weekly and 24 weekly. Other manufactures were to a less amount. The exports amounted to 12,854,694 dollars; the imports to 574,651 dollars.

Divisions and Towns.—The state is divided into 49 counties. Montgomery, recently chosen by the legislature as the capital city of Alabama instead of Tuscaloosa, is situated on the east bank of the Alabama, at the head of the steam-boat navigation, in 32° 10′ N. lat., 86° 10′ W. long. The population in 1840 was 2250. The first stone of the new state-house was laid July 4, 1846. Cotton is shipped annually to the amount of 40,000 bales averaging 500 lbs. each. Tuscaloosa is situated on the south-east bank of the Tuscaloosa or Black Warrior River, in 33° 10′ N. lat., 87° 40′ W. long. It stands on an elevated plain at the lower falls at the head of the steam-boat navigation. It has a handsome state-house, a court-house, and gaol. The population in 1840 was 1949. About a mile to the east is the university of Alabama, founded in 1828 and opened in 1831, which has a president, 7 professors, 63 alumni, 60 students, and a library of 6000 volumes. Tuscaloosa is 256 miles north from Mobile by road. Mobile, a city and sea-port, is situated on the west bank of the Mobile River at its entrance into Mobile Bay, in 30° 45′ N. lat., 88° 25′ W. long. It stands on a wide and beautiful plain, fifteen feet above the highest tides. Next to New Orleans it is the largest cotton-mart of the southern states, 320,000 bales having been exported in a year. The population in 1830 was 3194; in 1840 it was 12,672, of whom 3869 were slaves. Florence, on the north bank of the Tennessee, immediately below the Muscle Shoals, contains about 2000 inhabitants. Steam-boats can ascend to it when the water is not low, and it has great advantages for trade. It was laid out in 1818 on a plain elevated 100 feet above the river. Huntsville, situated 10 miles north of the Tennessee, 34° 50′ N. lat., 86° 35′ W. long., contained, in 1841, 2496 inhabitants. Wetumpka, on the east bank of the Coosa, contained, in 1840, 2600 inhabitants. The Harrogate mineral springs near Wetumpka, render it a place of great resort in the summer months.

Constitution.—Alabama was admitted into the Union as a state in 1820. The governor is elected by the people for two years. The senators are elected for three years, and this number is not to be less than one-fourth of that of the representatives, nor more than one-third. The representatives are elected annually by the counties in proportion to their white population. The number is not to be more than 100 nor less than 60. The legislature meets annually at Tuscaloosa (or now perhaps at Montgomery), in October. The judiciary consists of a supreme court, a circuit court, and such inferior courts as the legislature may from time to time establish. The judges are elected every six years by joint vote of the two houses. The right of voting is possessed by every white male citizen of twenty-one years of age who has resided in the state one year preceding the election, and the last three months in the county, city, or town in which he offers his vote.

History.—Early in the 18th century the French formed a small settlement on the site of Mobile. Most of the territory of Alabama was included in the original patent of Georgia. In 1802 all the territory belonging to Georgia west of the Chattahoochee river was ceded to the United States, and this being extended to the Mississippi was formed into the Mississippi Territory in 1817. Alabama continued to form a part of the Mississippi Territory till 1820, when it became a state.

(Haskel and Clarke, *United States Gazetteer; American Almanac*, 1847.)

ALABASTER, a white stone used for ornamental purposes. The name is derived from Alabastron, a town of Egypt, where there appears to have been a manufactory of small vessels or pots, made of a stone found in the mountains near the town.

There are two kinds of alabaster: the one is a *carbonate* of lime; the other is gypsum, or *sulphate* of lime. Many of the ancient perfume vessels are made of the compact crystalline mass deposited from water holding carbonate of lime in solution, which is found in many places in almost every country. It is easy to ascertain of which of the two kinds a vessel is composed, for *carbonate* of lime is hard, and effervesces if it be touched by a strong acid; but *sulphate* of lime does not effervesce, and is so soft that it may be scratched with the nail. The term alabaster is now generally applied to the softer stone. This last, when pure, is a beautiful semi-transparent snow-white substance, easily worked into vases, lamps, and various other ornaments, but it is seldom found in masses large enough for statuary; and, indeed, artists would be unwilling to execute any great work in a material so very liable to injury. It is largely found in Italy and in Derbyshire. [GYPSUM.]

A'LABES, a genus of fishes belonging to the order Malacopterygii, and family Apodes. This genus, which consists of a single species of small size, a native of the Indian Ocean, resembles, in most respects, the common conger-eel of our own seas. [MURÆNIDÆ.]

ALAIS, a town in France in the department of Gard, standing on the river Gardon, which enters the Rhone at Beaucaire. The town stands in 44° 7′ N. lat., 4° 4′ E. long. It is well-built, has a tribunal of first instance and of commerce, a college, an agricultural society, and a small public library: it is the centre of a considerable trade in raw and dressed silk, and has manufactures of pottery, glass, stockings, gloves, hats, and especially of ribands, which are exported to Spain and Spanish America. There are rich iron and coal mines, and extensive ironworks near the town, which have contributed greatly to its prosperity. A railway constructed from Alais to Beaucaire, and passing through Nismes, connects the mine district with the canals and railroads leading to the Mediterranean, and is expected to add greatly to the importance of this thriving town. The population of Alais is 13,000. The arrondissement of Alais, of which Alais is the chief town, contains nine cantons, which are subdivided into ninety-six communes: the population of the arrondissement in 1841 was 88,370.

ALAKANANDA, a river of Hindostan, one of the two principal branches which form the Ganges. [HINDUSTAN.]

ALAND, an island which gives name to a small archipelago at the entrance of the Gulf of Bothnia, consisting of this principal island, and a great number of smaller islands, such as Ekeroe, Föglee, Vordoe, Lemland, &c. About eighty of these islands are inhabited, and about 200 uninhabited. The word Aland is properly written with a small cipher over the top of the A, and is pronounced Oland, which signifies the 'Land of Rivers or Waters.'

Aland has its northern point intersected by the parallel of 60° 15′ N. lat., and the meridian of 20° E. long. passes through the island. Its greatest length from north to south is about 18 miles; the greatest breadth from east to west about 14 miles. Its coasts are deeply indented, and offer several excellent ports, of which the best is Ytternäs. The island is mountainous. The inhabitants, who are Swedes, are skilful seamen, and in a great measure employed in fishing and catching seafowl. They have been estimated at from 13,000 to 14,000. These islands are included in the government of Finland, and were ceded to Russia in 1809.

ALA'NI is the collective name of different nomadic nations who lived in the countries north of the Euxine and the Caspian. They may be divided into European and Asiatic Alani. The name appears to have originally belonged to a Caucasian tribe which lived between the chief range of the Caucasus and the Portæ Caspiæ, now the Iron Gate, near Derbend, and as far north as the great steppe between the Kuma and the Volga. Under the later empire the Alani made frequent incursions into the Roman provinces. The Emperor Gordian was defeated by them near Philippópolis, A.D. 242; and they took a decisive part in the victory which they and the Goths obtained in A.D. 378, near Adrianople, over the Emperor Valens, who was killed in or after the battle. (Amm. Marcell. xxxi. 13.) In A.D. 406 the Alani invaded Gaul with the Vandals, Suevi, Burgundians, and other barbarians. After having lived some years in that country, part of them joined the West Goths and Vandals for the purpose of invading Spain, which soon yielded to their arms (A.D. 411). The Alani then settled in Lusitania, and lived for some time under their kings, till they quarrelled with the West Goths, whose king, Wallia, defeated them in A.D. 440 in a pitched battle. Upon this the Alani joined the Vandals, and shared their fate in Spain as well as in Africa. After A.D. 440 they ceased to be an independent nation; but a part of them still remained in Gaul, and were settled in the neighbourhood of Valence.

The Alani were undoubtedly a Circassian nation; and as the social state of the Caucasian tribes seems to be nearly the same as it was fourteen hundred years ago, a nearer acquaintance with these people will enable the student to form a pretty correct idea of the state of civilization of many of the barbarians who overthrew the Roman empire.

(Mascou, *Hist. of the Antient Germans*, translated by Ledlard.)

ALARCON, JUAN RUIZ DE, a Spanish dramatic writer, who lived about the middle of the seventeenth century. Though an author of great merit and well-deserved reputation, very little is known of his life. Nicholas Antonio says, that he believes him to have been born at Mexico, of Spanish parents, and that he was both an actor and a dramatic writer, scarcely equalled by any of his contemporaries, for purity of diction, elegance, fluency, and copiousness. It is by 'La Verdad Sospechosa' (Suspicious Truth) that he is best known to us. Corneille, who translated it into French under the title of 'Le Menteur,' speaks of it in the highest terms. 'The argument,' says he, 'is, in my opinion, so ingenious and so well treated, that I have said many times, that I would willingly give two of my best plays to have the merit of the invention of this. I have seen nothing equal to it either in the ancients or moderns.' Alarcon is undoubtedly one of the best dramatic writers of Spain. His plots are ingenious, and conducted in a masterly manner; his characters are romantic; he is not so fertile as Lope de Vega in his productions, but is more correct and equal; he is as pure and elegant in his diction as Calderon, but less metaphysical. (Nicoláo Antonio, *Bibliot. Hispan.*; Martinez de la Rosa, *Obras.*)

ALARIC, one of the most eminent of those northern chiefs who successively overran Italy during the decline of the western empire, and the first of them who gained possession of imperial Rome. He learned the art of war under the emperor of the east, Theodosius, who curbed the Goths by employing them in different parts of the empire, and recruited his armies from the youth of the nation. But on the death of Theodosius they threw off the yoke, and Alaric, born of one of the noblest families of the nation, was chosen by his countrymen as their leader. Under his guidance, the Visigoths, the division of the Gothic nation to which he belonged, carried on a series of wars, varied by a few transitory alliances, against both the empires of the east and the west, and at length he determined to make his way into the empire of the west, for the purpose of establishing a kingdom by conquest.

We cannot trace minutely the motions of the Gothic army. Early in the year 403 it appeared before Milan, which was immediately evacuated by the Emperor Honorius. Besieged in the fortress of Asta, he was on the point of surrendering, when Stilicho came to his assistance, with an army hastily recalled from the frontiers of Gaul and Germany. On Easter-day, A.D. 403, was fought the battle of Pollentia. The testimony of historians varies as to the event of it; but the advantage seems to have been on the side of the Romans. It is certain, however, that in a subsequent battle near Verona, Alaric was completely defeated by Stilicho; and was compelled to ratify a treaty with the empire of the west; and to retire from Italy. (Claudian, 'De Bello Getico.')

After his retreat from Italy, Alaric was nominated by Honorius master-general of the Illyrian prefecture, but, at the end of a few years, when his army was recruited by the German youth

who were attracted by his fame, he renewed his design of establishing himself in Italy. Claiming an extravagant reward for the services which he had performed, he plainly intimated that war would be the consequence of a refusal, and for the time he was bought off by a contribution of 4000 lbs. weight of gold. While the Visigoths were yet at the foot of the Alps, the cowardly and weak Honorius procured the assassination of Stilicho, the only man who could still have defended the empire. Those Visigoths who were serving in the pay of the empire had left their wives and children in the Roman cities: they were all massacred at the same time. Alaric crossed Venetia without encountering any Roman soldiers, advanced to the very walls of Rome, and formed the siege. An application for terms was made on the part of the Romans, with an intimation that if once they took up arms they would fight desperately. Alaric returned this pithy answer: 'The closer hay is pressed, the more easily it is cut.' He demanded all the wealth of Rome. The ambassadors asked what he would leave to the inhabitants? he answered, 'Their lives;' yet he at length consented to retire on condition of receiving a heavy ransom. But Honorius, although he had taken no measures for the defence of his capital, constantly refused to ratify all the treaties by which it might have been saved. This obstinacy brought back Alaric. He laid siege to Rome a second time in 409. The imposing name of the Eternal City seemed to inspire the barbarian with involuntary respect, and after a short interval, Honorius was reinstated on a powerless throne. A treacherous attack on the Goths at Ravenna, while the conferences were still open, exhausted the patience of Alaric. The city was a third time besieged; and Alaric entered at midnight on the 24th August, 410, when he gave the town up to be pillaged for six days, but with orders to his soldiers to be sparing of blood, to respect the honour of the women, and not to burn buildings dedicated to religion. He died a few months after, while besieging Cosenza in Calabria. His wife's brother, Ataulphus (Adolph), was chosen as his successor by the army. Ataulphus was a friend to peace, and wished for nothing beyond a settlement in the empire and the hand of Placidia, the sister of Honorius. He obtained both those objects; but in a short time was assassinated by one of his equerries.

(Zosimus; Claudian; Jornandez, *De Rebus Goth.*; Gibbon. ch. xxix. xxxi.)

ALARIC II., king of the West Goths, succeeded his father Eudes, in A.D. 484. He was a peaceful sovereign, and thence unpopular with his people, who were partial to war. He was an Arian, as most of his countrymen were; but he was a very tolerant man, as we see from the acts of the council of Agde, which was held in A.D. 506. His toleration was the cause of his ruin. Clovis, king of the Franks, having overthrown the last remnants of the Roman power in Gaul, coveted the fine countries west of the Loire; and declared war against Alaric. The old East Gothic king, Theodoric the Great, whose daughter Theudigotha was the wife of Alaric, foresaw the war, and tried to prevent it by conciliatory means: the letters which he wrote to that effect to the kings of the Franks, the West Goths, and the Burgundians, are given by Cassiodorus; but his endeavours were in vain, and the war broke out in A.D. 507. In a pitched battle near Vouglé, in the environs of Poitiers, Alaric's army was entirely defeated. He fled, but was overtaken and killed. A proof that Alaric was peaceful because he appreciated the blessings of peace, and that he was able to consolidate that peace by a regular system of legislation, is the code called BREVIARIUM ALARICIANUM.

(Cassiodorus, *Variar.* 3, ep. 1, &c.; Procopius, *De Bell. Goth.* ii. 12; Jornandes, *De Reb. Goth.* p. 129, ed. Lindenbrog; Mascou, *Hist. of the Ancient Germans*, translated by Lediard.)

ALASSIO. [ALBENGA.]

ALATAMA'HA, a large river of Georgia. [GEORGIA.]

ALAUDA (Lark), a genus of granivorous birds, comprising numerous species. The skylark and woodlark are familiar examples. These birds are mostly terrestrial in their habits, and trip lightly along, aided by their long and straight hind claw. The bill is straight, strong, and conical; and the feathers on the top of the head are capable of being raised up so as to form a short crest. [LARK.]

A'LAVA, one of the old Basque provinces of Spain. [BASQUE PROVINCES.]

ALBA, PROVINCE OF, an administrative division of the Sardinian States, is bounded on the east by Aqui and Alessandria, north by Asti and Torino, west by Saluzzo, and south by Mondovi. The country is hilly, and it is intersected from south to north by the Tanaro, an affluent of the Po. The products are wine, corn, pulse, fruit, and silk. The area of the province of Alba is about 300 square miles, and the population is 105,700 inhabitants.

The head town, Alba, a bishop's see, is situated in a fertile plain near the banks of the Tanaro, and contains 8000 inhabitants. It has a cathedral and several other churches, an hospital, a royal college, and several private collections of ancient medals and other antiquities which have been found in the neighbourhood. Alba was a town of the Statielli, and it is said to have been restored by Pompeius Strabo, the father of Pompeius Magnus, in consequence of which it was called Alba Pompeia. In the middle ages Alba was one of the principal towns of the marquisate of Monferrato. It was annexed to the dominions of the house of Savoy by the treaty of Cherasco in 1631.

The other towns of the province are: 1, Brà or Braida, a considerable place, of 10,000 inhabitants, in a district abounding with corn, wine, fruit, cattle, and silk. Brà is not far from Pollenza, built on the site of the ancient Pollentia, where Stilicho defeated the Goths, A.D. 403, and for a time saved Italy; 2. Sommariva del Bosco, a town of about 5000 inhabitants; 3, Canale, with about 4000; and other smaller places.

(Casalis, *Dizionario Geografico, Statistico, Commerciale, degli Stati di S. M. il Ré di Sardegna.*)

ALBA, Town. [ALBA, PROVINCE OF.]

ALBA LONGA, ALBA'NO, ALBAN MOUNT and LAKE. The range of the Alban mountains rises out of the level of the Campagna, south-east of Rome: the whole is of volcanic origin. The original crater comprehends the whole circuit of the Alban mountains, on the outer margin of which are the towns of Frascati and Velletri, and there are four other craters within this circuit. One of these craters is the Campo di Annibale, the margin of which, called Monte Cavo, rises 500 feet above the Campo. The summit of the Monte Cavo (Mons Albanus), is 3000 feet above the sea, and on this the highest point of the Alban range was seated the ancient Temple of Jupiter, where the Latin nations used to celebrate their annual festival. The last remains of this venerable monument of antiquity were used about sixty years ago to make the garden wall of the *monastery* of the Passionists, which stands on the site of the ancient temple, and for other like purposes.

The view from this summit towards Rome and the sea comprehends the whole coast from Terracina to Cività Vecchia, a line of above 100 miles. The two lakes of Albano and Nemi lie almost immediately beneath the summit, and look like the glasses of a huge pair of spectacles. Both these lakes are the craters of extinct volcanoes. The whole of the Alban range is healthy, and in parts well cultivated and thickly inhabited. The nobility and gentry of Rome resort hither in the summer and autumn.

Alba was a considerable city anterior to Rome, and the centre of a confederation distinct from that of the Latins, but combined with it. (Niebuhr's 'History of Rome,' vol. i.) The site of Alba was a long narrow ledge, which rises above the monastery of Palazzuola, and is backed by the steep ascent of Monte Cavo. This position explains the name Alba Longa. The modern village of Roca di Papa, which is probably on the site of the Arx Albana, lies between Monte Cavo and another summit almost as high as Cavo. Alba was engaged in a war with Tullus Hostilius, king of Rome, to terminate which the famous combat of the Horatii and Curiatii was resorted to. (Livy, i. 25.) Owing, however, to some subsequent treachery of the Albans, the Roman king razed Alba to the ground, and removed the inhabitants to Rome, where they settled on the Cœlian hill. This is at least Livy's narrative: the celebrated house or *gens* of the Julii were among those who referred their origin to Alba. Of old Alba no vestiges remain. The modern town of Albano sprung up probably in the fourth century of our æra, but it had many reverses.

Under Urban VIII., in the seventeenth century, the Roman nobility began again to frequent the neighbourhood of the Alban Lake, and the present town of Albano gradually assumed its present form. It stands near the lake, about fifteen miles from Rome, on the high road to Naples, 1200 feet high, and is built on the site of the villas of Pompeius and Clodius, which the Emperor Domitian united into one. It consists chiefly of one long street, with several palaces of the Roman nobles; it is a bishop's see, and contains more than 4000 inhabitants. Above the town are the fine villa and gardens of Prince Barberini. The wines of Albano maintain their ancient reputation. On the banks of the Alban Lake is Castel Gandolfo, the country residence of the Popes, and farther on is the pretty town of Marino; at a short distance from the latter is the abbey of Grotto Ferrata, inhabited by Greek monks of the order of St. Basilius, and supposed to stand on the ruins of Cicero's Tusculan villa: fine avenues of shady trees lead to these several places. The Alban Lake is seven miles in circumference, and its surface is 918 feet above the level of the sea; the shore is high, lined with trees, and covered with gardens and orchards: the water is clear, and its depth 300 feet. An emissary, designed to prevent the sudden overflowings of the lake, which threatened the plain below, was constructed by the Romans in the year 358 after the foundation of the city; and it remains unimpaired to this day. They made a tunnel in the mountain six feet high and about four feet in breadth, for the space of more than a mile, mostly through the solid rock. The water of this emissary flows into the Tiber below Rome by several streams.

(Piranesi, *Antichità di Albano e di Castel Gandolfo;* Westphal, *Die Römische Kampagne,* 1829, and his two maps.)

ALBA, FERNANDO ALVAREZ DE TOLEDO, DUKE OF, was born in 1508. He was the son of Don Garcia, and grandson of Don Fadrique, or Frederic, who was first cousin of King Ferdinand the Catholic, and the second Duke of Alba de Tormes. He entered very young into the service of the Emperor Charles V.; was present at the battle of Pavia, at the siege of Tunis, and in the expedition to Algiers. He afterwards followed him to Hungary; but his reserved disposition, and the bent of his mind to politics, at first gave an unfavourable idea of his talents as a general. On the emperor wishing to know his opinion about attacking the Turks, he advised him rather to build them a golden bridge than offer them a decisive battle. Through his wise measures, however, the emperor obtained a complete victory over Frederic of Saxony at Mühlberg, where the elector was made prisoner, and Alba subsequently commanded at the siege of Mentz.

About 1556 Pope Paul IV. had deprived the house of Colonna of their states. The French favoured the Pope; and the Duke was ordered by Philip II., who had succeeded Charles on the Spanish throne, to proceed to Italy against the united French and papal army. Immediately upon his arrival, he obliged the Count of Brisac to raise the siege of Ulpian; placed Milan in a state of security; and, proceeding to Naples, where the Pope by his intrigues had caused serious disturbances, he restored tranquillity, and secured respect for the Spanish authority. He next made himself master of the Campagna of Rome, with a determination to humble both the Pope and the French; but, much against his advice, an honourable treaty of peace was concluded

with the Pope, and himself subjected to the humiliation of asking the Pope's pardon.

About 1560 the Flemish provinces of Spain began to manifest symptoms of discontent. Philip, a bigoted Catholic, was determined to maintain the Roman religion in all its purity throughout his dominions. He attempted to destroy the liberty and privileges of the Netherlanders, and establish the Inquisition, at any hazard. When one of his ministers represented to him, that if he did not abolish the inquisitorial edicts he exposed himself to the risk of losing the states, he answered, that he 'would rather have no subjects at all than have heretics for his subjects.' A rebellion was the result of this ungenerous policy. To quell it, Alba was furnished with troops and money, and invested with unlimited powers. He set sail from Spain in 1567, and on his arrival at Brussels, the country which, under the mild and amiable regent Margaret of Parma, had been comparatively tranquil, became full of alarm. The Prince of Orange fled to Germany, and in vain urged the Counts of Egmont and Horn to do the same. Alba summoned a council of state to his house to consult about the best means of restoring tranquillity and repressing sedition. The two counts came as councillors, when Alba seized them, with the secretary, Cassenbrot, and put them in prison. His other proceedings were also so severe that more than thirty thousand persons sought refuge in the neighbouring countries.

The Prince of Orange had collected an army in Germany, with which he advanced into Friesland, and defeated a body of Spaniards at Groningen. This precipitated the fates of Egmont and Horn; they were condemned and beheaded; and the secretary of Egmont was fastened alive to four horses, and torn in pieces. The Prince of Orange was desirous of giving battle to the Spaniards, but the duke avoided an engagement; and the patriot army was forced to disband. Alba returned to Antwerp to carry on the fortifications of the citadel. The works were soon finished; and in the middle of the fortress the duke caused his own statue, in brass, to be erected. This statue represented him in full armour, and at his feet a two-headed monster, referring allegorically to the nobility and the people. The whole was supported by a pedestal of marble, with an arrogant inscription. This insult to a nation was so revolting, that it alienated even his friends; and his fall was hastened by the cruelty practised towards the inhabitants of Haarlem, where he caused more than two thousand persons to be executed, after having led them to expect forgiveness if they surrendered. His health was also now in a weak state; the greater part of Holland had revolted, and proclaimed the Prince of Orange stadtholder; his armies had ceased to be invincible; and he requested to be recalled. In December, 1573, he published a general pardon, and left a country which he had rendered desolate; in which he had delivered into the hands of the executioners eighteen thousand victims, and kindled a war which raged for thirty-seven years, and cost Spain the blood of her best troops, immense treasures, and the final loss of some of her richest provinces. The first act of his successor's authority was to demolish his statue; so that nothing remained in Flanders after his departure but the memory of his cruelty.

On his arrival in Spain, he was sent as a prisoner to his castle of Uceda. Four years afterwards, Henry II. of Portugal died, leaving no rightful heir. Philip II. of Spain put in a claim, which he enforced by the sword. Alba was now summoned from his retirement, and at the head of twelve thousand men entered Portugal by Elvas. In two weeks he placed Philip in possession of the crown of Portugal. Three years afterwards he died at Lisbon, in 1583, at the age of seventy-four.

The Duke of Alba was, undoubtedly, the ablest general of his age. He was principally distinguished for his skill and prudence in choosing his positions, and for his rigid enforcement of the strictest discipline in his army. Being at Cologne, and avoiding, as he always did, an engagement with the Dutch troops, the archbishop urged him to fight. 'The object of a general,' answered the duke, 'is not to fight, but to conquer; he fights enough who obtains the victory.' During a career of so many years' warfare, he never lost a battle. Firmness, energy, and caution, were united in the character of Alba, yet he was a bigot and a tyrant. Under more favourable states of society, these qualities might have produced a just and benevolent statesman.

(Mariana, *Hist. de Esp.*; Bentivoglio, *Guerr. di Flandr.*; Do Campo, *Hist. de Portugal.*)

ALBA'NI, a patrician Roman family, originally from the town of Urbino. One of its members, Cardinal Gian Francesco Albani, was raised to the papal see in 1700, when he assumed the name of Clement XI. Since that time the Albani have been classed among the Roman princes, and have furnished the church of Rome with a succession of cardinals, who have been in general men of taste and abilities, and have exercised considerable influence at the papal court. Cardinal Alessandro Albani, in the last century, was known as a patron of the arts, to which he devoted his fortune. During the course of fifty years he enriched his villa outside of Porta Salaria with a magnificent collection of statues, marbles, and other precious objects of art, which rendered the Villa Albani one of the most interesting spots about Rome. When the French republican army invaded Rome in 1798, this villa was stripped of all its treasures. Cardinal Albani had shown himself averse to France, and had urged the pope to form a league with the other Italian states to oppose the French arms. The cardinal, however, escaped to Naples. After the death of Pius VI., Cardinal Albani repaired to the conclave at Venice, which elected Pius VII., and soon after died at an advanced age.

ALBA'NI, FRANCESCO, was born at Bologna, March 17, 1578, and was placed under the tuition of Denys Calvert, to be instructed in painting. Guido Reni was studying at the same time under that master, and being more advanced in art than Albani, he was enabled to afford him effectual assistance in his studies. The two

youths quitted Calvert, and placed themselves under Ludovico Carracci, whose school began about this time to be conspicuous in Lombardy, and under that great master they pursued their studies with an emulation advantageous to both. Having made considerable proficiency, Guido proceeded to Rome, whither he was followed by Albani, whose talents soon excited attention in that metropolis of art. Annibale Carracci had been employed to ornament the chapel of San Diego, in the National Church of the Spaniards; but being disabled by illness, he recommended Albani to continue the work, which he finished so successfully as to obtain universal applause. He afterwards painted several large pictures at Rome, Mantua, and Bologna, but it is on his small pictures that Albani's reputation is chiefly founded. The natural bent of his mind was towards subjects of feminine and infantine softness, to high finishing rather than bold effect. All his latter works are small and elaborate; they became extremely fashionable during his day. Albani was well acquainted with ancient sculpture, but displays no indication of such knowledge in his male figures; his women and children are better drawn. He might have become a good colourist, but for that anxious and elaborate mode of finishing which impairs the brilliancy of his tints, and gives his flesh the appearance of ivory. There are, at Burghley House, the seat of the Marquis of Exeter, some tapestries from his designs. Three of his pictures, viz. the Three Marys at the Sepulchre, and two Holy Families, are well engraved by Sir Robert Strange. Albani died Oct. 4, 1660. (Malvasia, *Felsina Pittrice;* Passeri, *Vite de' Pittori*, &c.)

ALBANIA, a country of European Turkey, stretching along the coast of the Adriatic and Mediterranean seas.

Physical Geography.—Albania is bounded on the north-east, north, and north-west, by Hertsek, Bosnia, and Servia; on the east by Roumelia, south-east by Livadia, and west by the Mediterranean Sea and the Adriatic. The country thus bounded is that in which the Albanian language is vernacular; but the political province embraces a somewhat wider range.

Albania is a mountainous region; ridges intersected by deep ravines cover the southern part of the country: the northern part is not so well known, having been less visited by travellers. The Acro-Ceraunian mountains, now called Khimára, after running north-west nearly parallel to the coast, form a bold headland just at the entrance of the Adriatic. The rugged rocks heaped one upon another, with their summits hidden in the clouds, and their base washed by a sea continually agitated, were regarded with apprehension by ancient navigators. The hills of Zagori, running south-east near the frontier of Albania and Macedonia, have flat summits, spreading into extensive plains. A semicircular chain of lofty mountains, once known by the name of Scardus, and now called Gliubotin and Nissava Gora, incloses the basins of the Moroka and the Drin; and a continuation of it (in some parts 4000 feet above the level of the sea) runs southward, under the denominations of Tzumerka and Metzovo, uniting with the ancient Pindus.

The rivers of Albania are not of any great size or importance. They flow from the eastern frontier into the Adriatic or the Mediterranean. The Moroka and Paskola unite their streams, and pass through the lake of Scutari into the Adriatic; the Black Drin and the White Drin also flow into the Adriatic. Farther to the south, we meet with the Skombi (ancient Genusus), the Beratina or Krevasta (ancient Apsus), the Boiussa or Voiussa, the Calamas (ancient Thyamis), the Acheron, and the Arta. The largest of the Albanian rivers, the White Drin, is about 150 miles long. The principal lakes are those of Scutari or Zenta; of Okhrida, the ancient Lake of Lychnitis; of Joánnina, which has been confounded with the ancient Acherusia; and of Butrinto.

Productions and Industry.—The climate of Albania in the lower regions is perhaps about as warm as that of Italy, but droughts and sudden and violent north winds render it less agreeable. In the part which lies south of 40° N. lat., and which corresponds to the ancient Epirus, the climate is colder than in Greece.

Among the natural productions may be mentioned many species of oak; as the *quercus cerris*, with its broad indented leaves, and large hairy-cupped acorn, affording timber of good size and quality; and the Valonia oak (*quercus ægilops*), the acorns of which are deeply set in thick scaly cups, which are used in dyeing, and supply an article of export from many parts of Turkey. Other trees are the chestnut, the plane, the cypress, the ash, the cedar, the pine, and the larch. The wild vine and the elder are also frequent on the mountains, and the woods and wastes nourish the Amphilochian peach, the Arta nut, and the quince. The cultivated fruits are the olive, which might be rendered more productive by better care; the vine, the pomegranate, the orange, the lemon, the mulberry, and the fig. The agricultural produce consists of barley, oats, maize, and other grains, tobacco, and cotton; some portion of it is exported.

The horses are spirited and active, but not large; asses are also used. The oxen are ill-shaped and stunted; flocks of sheep and goats are numerous. Considerable numbers of all these animals were and probably continue to be sold into the Ionian Islands. The milk of the goats is made into cheese, a small quantity of which is exported; and their skins serve to hold wine (to which, however, they impart a strong flavour); the flesh of the kids is considered equal to lamb. The dogs which Mr. Hobhouse saw on his road from Arta to Joánnina, were not unlike the true shepherd breed in England; but were larger, (being nearly as big as mastiffs), with sharper heads and more curled and bushy tails. Fowls and eggs are abundant. Among the wild beasts are the bear, the wolf, and the jackal. The lakes abound with water-fowl.

The agricultural skill of the Albanians is not great. Their plough is of simple construction, and in time of harvest they reap their corn, though

with little skill, and they never mow it. The business of sowing and reaping is left to the women and to the aged. The young men fell timber or dress the vines; nor are they averse to the occupation of shepherds, as it enables them to indulge that idleness to which, when not engaged in war, they are prone.

The Albanians have few arts or manufactures. They export a considerable number of capotes, annually; and they produce some embroidery on velvet, stuff, and cloth, for which the country enjoys a better reputation than any other part of European Turkey; but this is the work of the Greeks of Joánnina, who are an industrious people, rather than of the Albanians. The physicians in large towns are Greeks, but the surgeons are commonly Albanians; their practice is, however, of a very inartificial and somewhat violent character.

The trade consists mainly in the exchange of natural productions for the manufactures of nations more refined. Oil, wool, wheat, maize, and tobacco, are sent to the kingdom of Naples, or to the Ionian Isles and Malta; and sheep, goats, cattle, and horses, to the Ionian Islands. Cotton-wool and timber are exported from the Gulf of Arta; but the cotton is brought chiefly from Thessaly, and the timber from ancient Acarnania, on the south side of the gulf. The manufactured goods which they export are—capotes; gun and pistol stocks, mounted in chased silver, plain and gilt; and embroidered velvets, stuffs, and cloths. They import coffee and sugar from Trieste; knives, sword-blades, gun-barrels, glass, and paper, from Venice; gold and silver thread, for embroidery, from Vienna; French and German cloth, coarse and ill-dyed, from Leipsic; and caps and a few other articles from various parts. The want of ready means of communication is a great impediment to traffic. Goods are conveyed by pack-horses, four or five of which are attached to each other by cords, and guided by one man.

Inhabitants.—No trustworthy estimate seems to have been made of the population of Albania, on account partly of the varying limits given to the country bearing that name.

The Albanians are about five feet and a half high, muscular and straight in their persons. They have broad full chests, long necks, long oval faces, with prominent cheek bones, and flat raised foreheads, arched eyebrows, blue or hazel (rarely quite black) lively eyes, thin straight noses, thin but open nostrils, and small mouths, furnished with good teeth. Their complexions are white in youth, but get tinged or dusky in old age. They wear mustachios, but shave off the rest of the beard. The women are tall, strong, and not ill-looking, but their appearance indicates wretchedness, ill usage, and hard work. They are not so early marriageable as the women in southern Greece, but they retain their good looks longer, and give birth to children at a more advanced period of life.

The dress of the better sort consists of an outer mantle, made of coarse woollen stuff, bordered and variously figured with red threads, which, falling loosely from the shoulders behind, reaches as low as the knees; of two vests (the rich sometimes adding a third), the outer one open, the inner laced in the middle and richly figured; of a broad sash or belt, with one or two pistols, the handles of which are often long, and curiously wrought with silver; of a coarse cotton shirt, the lower part descending from beneath the belt like a Highland kilt, with drawers of the same material; and of variously coloured stockings, or high socks, and sandals. They wear also a small red skull-cap, and metal greaves or coverings for the knees and ankles. The most remarkable part of an Albanian's dress, is the capote, or cloak, a coarse shaggy garment either of a grey or white wool, or black horse hair, with open sleeves and a square flap or cape behind, which serves sometimes for a hood. The richer Albanians often add to their dress a shawl tied on the head like a turban.

Although culpably negligent in regard to cleanliness, the Albanians are fond of ornaments. They wear silver chains round the neck with amulets, silver snuff-boxes, or watches with shagreen cases, at the end; a kind of pencase, also of silver; and silver-mounted pistols, when they can afford them.

The food of the Albanians consists of wheaten or barley bread, but principally of cakes of boiled or roasted maize; of goat's milk cheese, rice, butter, eggs, dried fish, vegetables, and a small proportion of animal food. Their beverage includes milk, coffee, wine, a distilled spirit called rackee, and one or two Italian liqueurs.

Their habitations are for the most part very neat. The cottages have seldom more than one floor, and that of mud, which is regularly swept and is quite dry. The rooms are commonly two, one of which is appropriated to the store of maize in the stalk, and of grapes, which are sprinkled with salt. The fire is made on the floor, and as they have only a hole to serve as a chimney, it is not surprising that their apartments are sometimes smoky. Their furniture is very simple, and consistent with their mode of life.

Their houses are detached, with a garden to each. Their villages have a green with a large tree for holiday sports. On this green is the circular paved threshing-floor, where the corn is trodden out by horses, which are fastened by a cord to the post in the centre of the floor, and driven round, sometimes to the number of eight or nine abreast.

In their domestic economy, the Albanians have the character of treating their women very little better than cattle. Among their amusements dancing is one of the most common, the instrumental accompaniment being afforded by a kind of three-stringed guitar. It is in the narrow vales and barren mountains of the country that the Albanians show their true character, whether in language, dress, or customs.

The Albanians are distinguished for their nationality, which is with them a far more powerful feeling than religion. Robbery, under varied forms, is almost a regular employment among them. They are proud of their prowess;

indeed the Albanians have always been of a warlike character. They were the soldiers of Pyrrhus, one of the most formidable opponents whom the Romans encountered; and under Scanderbeg they arrested for awhile the tide of Turkish conquest. At present, under the denomination of Arnauts, they rank among the flower of the Ottoman army, and are found as mercenaries in all parts of Turkey and in the Barbary States. They take the field without baggage or tents, and are far more active than the Turkish soldiery.

In regard to the towns inhabited by the Albanians, no one of them can be designated as the capital; for the country is not under the government of one pasha. Joánnina, which is indeed beyond the boundaries of Albania strictly so called, is the most important; and after it may be mentioned Skódre, Okhrida, Berát, Durazzo (the ancient Dyrrhachium), Délvino, Argyro Castro, Avlóna, Prevesa, and Arta. Parga was, till delivered up to the Turks, a town of considerable size, having 8000 inhabitants. These were Christians of the Greek and Latin churches. The people of Antivari and Dolcigno, are chiefly Mohammedans. Their situation on the coast leads them to become sailors, and they are the only Albanians who have any acquaintance with shipping.

Albanian colonies are to be found in different parts of Turkey and Greece, especially in the ancient Attica, Bœotia, Argolis, Elis, and Laconia; but these are labourers. The warlike character of the nation is retained only by those who remain at home; and in the Morea the language is nearly lost, while in the Attic villages it is retained; these being probably colonies of later date. The people of Hydra are descended from Albanian colonists, but are scarcely distinguishable from their neighbours. But the most remarkable colonies are in Calabria and the Abruzzi.

History.—The Illyrians were probably the original stock from which the Albanians sprung. Ptolemy mentions a tribe of *Albani* in the district, with a town called Albanopolis; but they appear to have been insignificant, and till the twelfth century we lose sight of them. At that period, we read of their town under the name of Albanon, Arbanon, or Elbanon, and it is said to have commanded the passes from the country around Lychnitis to the coast. The above is only one among many hypotheses, of the origin of the Albanians. Some writers suppose them to be the descendants of the Albani of Asia, who dwell between the Euxine and the Caspian seas. Mr. Hobhouse, who adopts the above hypothesis, describes the modern Albanians as a mixture of Greeks, Romans, Goths, Vandals, Spaniards, Italians, Bulgarians, and Ottoman Turks, and supposes the basis of their language to be the Sclavonian. Pouqueville asserts the existence of a belief among the Albanians themselves that they are descended from the French; and Meletius, a geographer of the last century, says they are descended from Celts, who crossed over from Iapygia, now the Terra di Otranto, in the kingdom of Naples.

In the ninth and tenth centuries, Albania was included in the great Bulgarian kingdom, established south of the Danube, of which Lychnitis was the capital. In a subsequent period we find the Normans of Sicily and Tarento in permanent possession of some places on the coast. Durazzo was at once their depôt and place of shelter. On the capture of Constantinople by the Franks, Albania fell into their hands, but the natives gradually shook off the yoke; and by the fourteenth century their power was so far increased as to lead them to attempt conquests distant from their mountains, but they could not retain their acquisitions. Some of their northern towns were taken by the Venetians, and the nation ultimately bowed to the supremacy of the Turks. The valour of the celebrated George Kastrióte, or Castriot, called by the Turks Iskander (Scanderbeg), could only delay the subjugation of his countrymen. He died in 1466 or 1467, and the Turks completed the conquest of Albania in 1478. The people, indeed, were never entirely subdued, nor does it appear probable that the sultan ever had more authority than at present, when he cannot appoint a governor who is not a native of the province.

The Albanians, as might be expected from their imperfect civilization and their peculiar habits, are divided into tribes, each having its proper designation, and distinguished in some particulars from the adjacent tribes. Among these are the Guegues, or Ngége; the Mirdites, from whom Scanderbeg arose; the Liápe, notorious for their poverty, dirt, and thievery; the Khimárése, equally noted for their love of revenge; the Teské, and the Tzámi.

The country is under the government of the different Turkish pashas in whose territories it lies, as those of Joánnina, Scutari, Okhrida, Avlóna, and Delvino. But in a country of such character, and inhabited by such a people, the power of the pashas, unless wielded by a powerful hand, may be regarded as very small.

ALBANS, ST., a parliamentary borough in Hertfordshire, situated close to the site of the ancient Verulámium (Verulam), being separated from it by the small river Ver, a feeder of the Coln. Verulamium was probably at first a British town. The Roman road, called by the Saxons the Watling Street, was also called Werlaem Street, because it first went direct to Verulam, passing close under its walls. Verulam continued to be a principal Roman station while that people possessed this island. Some very small remains of the walls of Verulam still exist. Here an eminent citizen, Alban, is said to have suffered martyrdom in the persecution under Dioclesian. In his honour a monastery for one hundred Benedictine monks was erected in 793 by Offa, king of Mercia, one of the Saxon kingdoms established in Britain.

This monastery, at the head of which was an abbot, early obtained considerable importance, and the town was gradually formed near the abbey.

The town is well situated on the summit and southern declivity of a small hill, the abbey church being placed on the south side of the town,

at the back of High Street. The town is well paved and lighted, and has a supply of good water. The churches are, the Abbey Church, a rectory in the patronage of the mayor and burgesses; St. Peter's, a vicarage in the patronage of the Bishop of Ely; and St. Michael's, which is on the opposite or S.W. side of the Ver, and contains the monument of Sir Francis Bacon, who bore the title of Viscount St. Albans: there are also several dissenting meeting-houses. The grammar-school was founded by Edward VI.; there is besides a Blue-coat school, supported by some property in the funds, and by subscription, for educating about thirty-five boys in the principles of the established church, and clothing them. There are several alms-houses; the principal, called Marlborough-buildings, or simply 'the Buildings,' for thirty-six persons, half of each sex, were built and endowed by Sarah, Duchess of Marlborough.

The abbey church of St. Albans, which is part of the ancient abbey, was purchased by the inhabitants from Edward VI. for a parish church, at the price of 400*l.* and a fee farm rent of 10*l.*, which last payment was in 1684 redeemed for 200*l.* The abbey itself had been granted by Henry VIII. to Sir Richard Lee, upon the suppression of the religious houses in that reign. The church is built in the form of a cross. It is in length more than 600 feet from E. to W., including a Lady Chapel at the east end; and the extreme breadth is more than 200 at the intersection of the transepts. From the intersection rises a heavy square tower, crowned by battlements. The vast extent and elevated site of the church give it an imposing appearance. Much of the masonry consists of Roman tiles from Verulam, flints, bricks, &c. The architecture affords specimens of the style of every age in succession, from the time of the Normans to that of Edward IV. The most central parts are the most ancient. The choir is separated from the nave by St. Cuthbert's screen. There is also a richly-carved screen in front of the altar; and a few remarkable monuments, including those of Humphrey, duke of Gloucester, and of the Abbots Ramryge and Whethamsted. The church suffered considerably during the Parliamentary war, and on the 3rd of February, 1832, a part of the wall on the south-west side fell down, and in its fall did considerable injury, but the church has since been thoroughly repaired, and with very good taste.

The revenue of the abbey at the dissolution is estimated to have been 2510*l.*, a large income at that time. The abbot possessed also many privileges, and had a grant of precedence over all other abbots, from Pope Adrian IV. (Nicholas Breakspeare), the only Englishman who has ever been pope.

The population of the borough in 1831 was 4772. The additions made to the borough by the Boundary Bill, supplementary to the Reform Bill, increased the population to 5771. In 1841 the population of the borough was 6497.

The borough returns two members to parliament. The gaol delivery is four times a year, the town having a separate jurisdiction. The family of Beauclerc takes the title of duke from this town, and the family of Grimston that of earl from the ancient town of Verulam.

St. Albans is 20 miles N.W. by N. of London, and 12½ W. by S. of Hertford.

(Chauncy's *Hertfordshire;* Newcome's *History of St. Albans; Boundary Reports.*)

ALBANY, a district situated at the eastern extremity of the colony of the Cape of Good Hope in South Africa. It is bounded on the N. and N.E. by Caffraria; and on the E. and S.E. by the Indian Ocean. The length of the district, from W. to E., is seventy miles, and its average breadth is about twenty-five miles. It was formerly inhabited by the tribe of Ghonaqua Hottentots; but this race, whose numbers are now very much diminished, has retreated into Caffraria, leaving the European settlers in possession of the territory.

The principal stream of the district is the Great Fish River, which rises in the Sneeuwbergen or Snowy Mountains, and falls into the Indian Sea in 33° 30′ S. lat., and 27° 20 E. long. The chief towns are—Graham Town, 33° 22′ S. lat., 26° 21′ E. long.; Bathurst, 33° 24′ S. lat., 26° 37′ E. long.; and Fredericksburg, 33° 11′ S. lat., 37° 4′ E. long. A large natural salt-pan supplies the inhabitants of the colony with salt. The bays and inlets along the coast supply excellent fish. The surface of the country being very varied, both European and African plants can be grown. The wild animals which formerly inhabited the district having been mostly hunted down, the colonists are now able to lay out ground in pastures, which produce a valuable supply of wool.

The most important part of the trade of Albany consists in the traffic carried on by licensed traders with the native tribes beyond the boundary-line of the colony. This trade is carried on through a very wide extent of country in the Caffre territory. The principal articles procured in this manner are hides, horns, and ivory, together with a considerable number of live cattle. The sale to the natives of arms, ammunition, and spirituous liquors, is prohibited, and such goods are declared liable to seizure as contraband. Some few manufactories are established in Albany; among the rest are tanneries, a woollen-hat manufactory, numerous grist-mills, a manufactory for blankets and coarse woollen cloths, and establishments for making candles, of which article shipments are constantly made to Cape Town.

ALBANY, capital city of the state of New York, North America, is situated on the west bank of the Hudson river, 145 miles by the river from the city of New York, 42° 39′ N. lat., 74° W. long. The population in 1830 was 24,238; in 1840, 33,721. Albany is very advantageously situated. It has a fine river, navigable for vessels of eighty tons, with tide-water to Troy, five miles above Albany, communication by the Erie and Champlain canals with a wide extent of country to the north and west, as well as by the Mohawk and Hudson railroad, which terminates at Albany, and is connected with other lines to the west. There is also a railway in progress to Boston, which will extend its communication to the north-eastern coast. The Erie and Champlain canals

unite at Watervliet, eight miles above Albany, and the united stream flows into a capacious basin formed by a pier which extends a mile and a quarter into the river, and forms a safe harbour. There is daily communication with New York by steam-boats, except when the river is frozen over.

The town rises rapidly from the flat bank of the river for half a mile, but beyond that the surface is level. The Capitol, where the legislative assembly is held, occupies a commanding situation at the top of State Street. The other public buildings are, the City Hall, the State Hall, the Albany Academy, Medical College, Albany Exchange, &c., and there are thirty places of worship. The Albany Academy, in its course of instruction, approaches a college, has eminent teachers, and 400 students.

Albany was originally a Dutch fort, erected in 1612 or 1614, called Fort Orange, and is therefore the oldest town in the United States except James-town, on the James river, which dates from 1607. Somewhat later it took the name of Williamstadt, which it retained till 1664, when the colony fell into the hands of the English. Its present name is derived from James II., to whom, when Duke of York and Albany, Charles II. granted the proprietorship of the colony.

(Haskel and Smith, *United States Gazetteer.*)

ALBANY, LOUISA, COUNTESS OF, daughter of Prince Stolberg Gedern, in Germany, was born in 1753, and married in 1772 to Charles James Edward, called the young Pretender, grandson of James II. They resided at Rome, and kept a little court. In 1780 Louisa left her husband, who was much older than herself, and with whom she did not agree, and retired to a convent. She afterwards went to France; but upon her husband's death, in 1788, she returned to Italy, and lastly settled at Florence. She was then said to have secretly married Count Alfieri, the Italian poet, who died at her house in 1803. She, however, went by the name of Countess of Albany, as the widow of the last of the Stuarts, up to the time of her death, which happened at Florence in 1824. She was fond of literature and of the arts, and her house was resorted to by the most distinguished persons at Florence, natives as well as foreigners. [ALFIERI.]

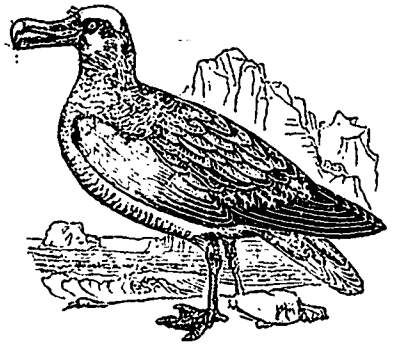
ALBATE'GNIUS (Astronomer). D'Herbelot calls him Mohammed Ben Giaber, but Mr. Gayangos, who has given more particulars of him than any one else (in the 'Biogr. Dict.' of the Society for D. U. K.), names him Mohammed Ibn Jábir Ibn Senán Abú Abdillah. The term Albategnius is the Latinized form of El Batani, or Al Bateni, from Baten, in Mesopotamia, where he was born. He lived in parts of the ninth and tenth centuries, beginning his astronomical observations in A.D. 877, and continuing them till his death in 929. He generally resided at Rakkah (Aracta) or at Bagdad. His writings comprise abridgments of Ptolemy and Archimedes, with comments; a work on astronomy, chronology, and geography; a treatise on the rising of the constellations, and various other points of astronomy; an elementary treatise on astronomy; and one on astrology; with minor works. His treatise on the rising of the constellations was printed, in a Latin version, in 1537 and 1645.

He was the first who rejected the chords, and substituted sines in their place, and of this apparently trifling improvement we are reaping the fruits to this day: he also used versed sines and (though without seeing the full extent of their utility) tangents. He determined the obliquity of the ecliptic with the parallactic instrument as described by Ptolemy, in such manner that his observation, compared with those of our time, gives 0″.505 for the annual diminution of that element: our modern tables give it, at this time, 0″.475. His sines gave trigonometry, even in his own hands, quite a new appearance and a new power; and he had a much greater number of methods in spherical trigonometry than the Greeks. He determined the length of the tropical year, making it only 2 m. 26 s. too short; a result much more exact than that of Ptolemy. The same may be said of his determinations of the precession of the equinoxes, of the place of the solar apogee, and of the eccentricity of the earth's orbit. Looking at his determinations of the two latter, and seeing that he does not infer that they are changeable elements, we are left to conclude that he attributed the difference between himself and Ptolemy to errors of observation. But as it is by the research of Albategnius that succeeding astronomers were able to infer the variability in question, Albategnius may be called the greatest astronomer of the Arabic school.

ALBATROSS, a group of oceanic web-footed birds, of large size, of which several species are known, included under the genus Diomedea. In this genus the beak is powerful and large, with a concave sweep from the base, and rising again towards the point, which is boldly and abruptly hooked; a furrow runs on each side of the upper mandible, from the base to the cutting edge of the terminal hook. In these furrows are the nostrils, standing out in the form of short tubes of horn, directed obliquely upwards. Toes, three before, and webbed; none behind. Wings, very long and narrow. The great Wandering Albatross (*Diomedea exulans*), is one of the most remarkable of the feathered tribes that arrest the notice of the voyager in the Southern Ocean; its vast extent of wing, its graceful evolutions, its power, displayed even in the tempest, when the wind lashes the waves into foam, have elicited the highest admiration. Now, high in the air, it sweeps in wide circles,—anon, it descends with the utmost impetuosity, plunges into the water, and instantly rising, soars aloft with its finny prey. It harasses the flying-fish which the bonito or the albacore is chasing, or sails round the vessel and picks up the offal thrown overboard. In all its evolutions it is lordly and graceful,—rising and falling as if some concealed power guided its motions, without any exertion of muscular energy,—and when the stormy gale drives the ship through the waves, it displays the same ease as when the winds and waves are in repose.

This noble bird breeds on remote rocky islands.

Captain Carmichael found it breeding at Tristan d'Acunha: it makes no nest, but merely selects some slight concavity for the reception of a single white egg.



The Wandering Albatross often weighs upwards of twenty pounds, and ordinarily measures from ten to eleven feet (sometimes even more) in its extent of wing. It varies in colour according to age and season; but is generally more or less tinged with grey above, the rest of the plumage being white. Like the petrels and puffins, it discharges a quantity of fetid oily fluid through its nostrils when captured or molested, clattering at the same time with its beak. It is often taken by means of a line and baited hook.

ALBEMARLE SOUND. [CAROLINA, NORTH.]

ALBEMARLE, DUKE OF. [MONK.]

ALBENGA, PROVINCE OF, an administrative division of the Sardinian States, forming part of the Duchy of Genoa, is situated on the southern slope of the Maritime Alps, which here become blended with the Apennines, and it stretches along the coast of the Mediterranean for about 30 miles. Its greatest breadth is about 18 miles. It is bounded on the N. E. by the province of Savona, on the S. W. by that of Oneglia, and on the N. by the province of Mondovi in Piedmont. The country is intersected by offsets of the Maritime Alps which run to the coast, and form narrow intervening valleys through which rush rapid torrents in times of rain. The only river that does not dry up in summer is the Arocia, which rising in the province of Oneglia, flows in a south-east direction through the long valley of La Pieve, receives a number of mountain torrents, and afterwards entering the plain of Albenga about four miles above its mouth assumes the name of Centa, and then joins the sea to the west of the town of Albenga. Formerly the river flowed to the eastward of Albenga, where is still to be seen a Roman bridge of ten arches, the piers of which are now buried in sand. The plain of Albenga, one of the few plains in the Genoese territory, is celebrated for its great fertility. It produces corn, hemp, wine, oil, and fruit. Oil is the staple product of the country. A great number of the inhabitants of the coast lead a seafaring life. The province of Albenga contains 53 communes and 57,500 inhabitants.

Albenga, the head town of the province, situated in a plain about a mile from the sea-coast, is a bishop's see; it has several churches, some lofty towers, a grammar-school, and about 4300 inhabitants, who live chiefly by agriculture. The town existed in the Roman times under the name of Albingaunum, and it belonged to the tribe of the Ligures Ingauni. In the middle ages, Albenga governed itself as a municipal town under the supremacy of Genoa.

The other towns of the province are:—1, Alassio, a town on the coast, south-west of Albenga; it has a collegiate church, a communal college, and 6300 inhabitants, mostly employed in seafaring pursuits. About twenty merchant-brigs belong to this place. Boats from Alassio carry on the tunny and herring fishery on the coast of Sardinia, and the tunny fishery on that of Tunis. The sailors from Alassio and the neighbouring town of Laigueglia (2000 inhabitants) are among the best and most trustworthy in the Mediterranean. Under the old Genoese republic the seamen of Laigueglia were among the few who ventured to trade under their own flag, and to brave the Barbary pirates who infested the sea, and especially the coast of Genoa. 2, Loano, eastward of Albenga, a town of 3500 inhabitants, has several churches, one of which is reckoned handsome. 3, Finale, the name of three small contiguous towns, distinguished as Final Marina, Final Pia, and Final Borgo, the united population of which amounts to above 6000 inhabitants. The valley of Finale is rich in orange-trees. Finale was taken possession of in 1602 by the Spaniards, who lavished large sums in fortifying the place. After the war of the Spanish succession, the Duchy of Milan having fallen to the share of the Emperor Charles VI., that sovereign, having no further necessity for the possession of Finale, sold it to the Genoese for 1,200,000 crowns. In 1743 the Empress Maria Theresa ceded to the King of Sardinia what she styled her rights upon Finale, with the proviso that the king was to reimburse the purchase-money to Genoa. This led to a rupture between Genoa and the Empress, which was followed by the forced occupation of Genoa by the Austrians, and its memorable deliverance through the bravery of the people in 1746.

(Bertolotti, *Viaggio nella Liguria Marittima*; Chabrol, *Statistique du Département de Montenotte.*)

ALBENGA, Town. [ALBENGA, PROVINCE OF.]

ALBERONI, CARDINAL GIULIO, was born in the state of Piacenza, in May, 1664. He was bred to the church, and became curate of a country parish. The Duke of Vendôme, who commanded the French army in Italy during the war of the Spanish succession in 1702-4, happening to be in the states of Parma, and being in want of corn for his troops, sent for Alberoni. Alberoni, who was a man of natural abilities and quickness, rendered himself useful to the French general; on which account, however, he became obnoxious to the opposite, or imperial party. When Vendôme was recalled from Italy, he took Alberoni with him, and he followed the duke into Spain, where the war was then raging in Catalonia. Vendôme employed Alberoni in his negotiations with the

court of Philip V., where at that time the Princess des Ursins enjoyed the greatest influence. Alberoni found favour with the princess, and through her means he was constituted agent of the Duke of Parma, at the court of Madrid; in which capacity he was instrumental in bringing about the marriage of Philip V. with Elizabeth Farnese, daughter of the Prince of Parma. The new queen procured the dismissal of the Princess des Ursins, and in gratitude to Alberoni had him appointed a member of the king's council, Bishop of Malaga, and lastly prime minister of Spain. He now devoted all his energies to rouse Spain from the state of weakness into which she had fallen during the preceding century, and make her act a principal part in the affairs of Europe. He involved Europe in a new war, but at length Philip V. was induced to write with his own hand an order for Alberoni's deposition, and his banishment from the Spanish territories. This happened at the end of 1719, after Alberoni had been minister about three years. Alberoni repaired to Italy, where he had transmitted large sums of money. Orders had been given by the Pope for his arrest, which Alberoni, however, evaded; and Pope Clement XI. having died in March, 1721, Alberoni suddenly repaired to Rome to attend the conclave. The new-elected Pope, Innocent XIII., quashed the proceedings against him.

Some time after, Alberoni was sent as legate to Romagna. But he had not yet totally forgotten his habits of intrigue; and contrived to embroil the diminutive republic of San Marino, which unfortunately was placed in the neighbourhood of his government. The Pope, however, disapproved of Alberoni's conduct, and sent another legate. This occurred at the beginning of 1740. Alberoni, after this, retired to Piacenza, his native country, where he lived in affluence, and built a large religious house. He remained in retirement, forgotten by the world, till the 26th of June, 1752, when he died at the advanced age of eighty-eight.

Alberoni left a quantity of MSS., from which a work, called his 'Political Testament,' published at Lausanne in 1753, was said to be derived. He is remarkable as one of the most prominent examples of that class of statesmen who rose to power by the most pitiful intrigues; and who, being uncontrolled by public opinion, thought their own ambition and their pretended zeal for their despotic masters a sufficient motive to plunge the people of Europe into continual wars, in which they had no real interest; and whose effects have so long retarded the natural progress of mankind in civilization by the efforts of peaceful industry.

ALBERT I., duke of Austria, and afterwards Emperor of Germany, was the son of Rudolf of Hapsburg, the founder of the imperial Austrian dynasty. Albert married the heiress of the former Dukes of Austria. After his father's death in 1291, he assumed the imperial title in opposition to the votes of the electors, who had chosen Adolphus of Nassau, who, after a war of several years, was killed in battle in 1298. Albert then ascended the imperial throne, and received, after many difficulties, the confirmation of the Pope, Boniface VIII. He was next engaged in wars with the Bohemians, whose country he attempted to conquer, but without success. Soon after this, the Swiss forest cantons revolted, on the 1st of January, 1308, against Albert's lieutenants, whose government was arbitrary and oppressive; this was the beginning of the Swiss confederation. [SWITZERLAND.] Albert, full of indignation, came with troops to chastise them; he advanced as far as Baden, in Aargau, where he summoned his vassals and held a council for the reduction of the revolted cantons. On the 1st of May, 1308, Albert left Baden to return to Rheinfelden, but as he crossed the river Reuss, in a boat, he was assassinated by some conspirators, headed by his nephew, John of Hapsburg, whose patrimony he seemed desirous of retaining. Agnes, Albert's daughter, and Queen of Hungary, carried her vengeance for her father's death to a most dreadful extent. The executions lasted several months. After this butchery Agnes built a monastery on the spot where Albert had been murdered, within sight of the Castle of Hapsburg, which monastery was called Königsfelden, and here she shut herself up for the rest of her days. The remains of this monastery and church are still to be seen, as well as the apartments which Queen Agnes occupied. (Johann Müller, *Geschichte der Schweitzer.*)

ALBERT II., king of Hungary and Bohemia, and Duke of Austria, succeeded Sigismund as Emperor of Germany, in 1438. He held a great diet at Nürnberg, in which the *Vehmic* or secret courts were suppressed. He died the following year, as he was preparing to take the field against the Turks, who were ravaging Hungary.

ALBERT, archduke of Austria, son of the Emperor Maximilian II., was made a Cardinal and Archbishop of Toledo. He was appointed by Philip II., in 1596, governor of the Low Countries. He resigned the cardinalship and married Elizabeth of Austria, daughter of Philip II., who brought him Flanders and Franche Comté as her dowry. In July, 1600, he fought the battle of Nieuport against the Dutch under Maurice of Nassau, in which he was defeated. Albert next besieged Ostend, which he took after a long and murderous siege, in which 100,000 men are said to have lost their lives on both sides. In 1609 Albert concluded a truce with the Dutch for twelve years, before the expiration of which he died, in 1621. He left no children; and the dominion of Flanders reverted to Spain.

ALBERT, prince of Mecklenburg, was called to the throne of Sweden in 1364, by the nobility who had deposed King Magnus. After a long war, peace was re-established in Sweden in 1395, when Albert consented to give up his claims to the crown. He then retired into Mecklenburg, where he died. Margaret of Waldemar, widow of Haquin, king of Norway, succeeded him, and united the three northern kingdoms under one sceptre.

ALBERT, margrave of Brandenburg, and first Duke of Prussia, was born in 1490. He was elected, in 1511, Grand Master of the Teutonic order, who held dominion over Prussia Proper,

that part of the present kingdom of Prussia which borders on the Baltic Sea. At the conclusion of a war with Sigismund, king of Poland, a peace was agreed on in 1525, at Cracow, by which the duchy of Prussia was secured to himself and his descendants as a fief of the crown of Poland. Albert some time after embraced the Protestant faith, and married a princess of Denmark. One of his descendants, Frederick William, elector of Brandenburg, threw off the allegiance of Poland, and his son, Frederick I., changed the title of duke into that of King of Prussia, in 1701. [BRANDENBURG.]

ALBERT DÜRER. [DÜRER.]

ALBERTI, LEON BATTISTA, a distinguished mathematician, but more celebrated as an architect, and hardly less so as a philosopher, poet, painter, and sculptor. He was of the ancient and noble family of the Alberti of Florence, but was born in Genoa, in 1404. He was nephew of the Cardinal Alberto degl' Alberti, and he himself became a canon of the metropolitan church of Florence. Having devoted much of his attention to the acquisition of the principles of architecture, by the observation and admeasurement of the remains of ancient edifices in various parts of Italy, Alberti became distinguished among the promoters of the then new style, which has been called a restoration of the ancient and classical. When at Rome, he was employed by the Pope, Nicholas V., to repair the ancient aqueduct of the Acqua Vergine, and to construct the Fontana di Trevi; but the structure was so much decorated by Salvi, in the pontificate of Clement XII., that not a vestige now remains of the design of Alberti.

At Florence, Alberti succeeded to the direction of several works which had been commenced by Brunelleschi, and left unfinished at his death. He himself designed and executed in Florence, the Palazzo Rucellai, the choir and tribune of the Church of the Annunciation; and some attribute to Alberti the principal front of the church of Santa Maria Novella. At Mantua he executed several edifices for the Duke Lodovico Gonzaga. But the most esteemed architectural work of Alberti is the church of St. Francis at Rimini, which he was employed to decorate by Sigismondo Malatesta, lord of that city. He wrote a work on sculpture, 'Della Statua,' which was followed by another on painting, "De Pictura,' which he calls 'prædilectissimâ et nunquam satis laudatâ arte,' (a most delightful art, never sufficiently praised); but his last and most esteemed work is his treatise on architecture, 'De Re Ædificatoria.' This was not published until after his death, when it was edited by his brother Bertrand, and, at his own desire, dedicated to Lorenzo de' Medici. He died in 1472. The monument of his family yet exists in the church of Santa Croce, at Florence. (Vasari, *Vite de' Pittori*, &c., ed. Schorn; Tiraboschi, &c.)

ALBERTINELLI, MARIOTTO, one of the best of the early Florentine painters, was born at Florence about 1475. He was the pupil of Cosimo Roselli, but he became eventually the friend and imitator of Fra Bartolomeo, whom he assisted in some of his works. In tone Albertinelli equalled, if he did not excel, Fra Bartolomeo: he excelled for his period also in design, and some of his works are drawn in a style worthy of the best of the *Cinquecentisti*, as the Italians term the painters of the sixteenth century. He drew from the antiques in the garden of Lorenzo de' Medici. His masterpiece is considered the Visitation of Elizabeth to the Virgin, in the imperial gallery of Florence. He painted several works in partnership with his friend Fra Bartolomeo; and when that painter joined the order of the Dominicans, Albertinelli completed his unfinished works. Vasari says that he died about 1520, aged forty-five, the victim of his own debaucheries. He had some distinguished scholars. (Vasari, *Vite de' Pittori*, &c.)

ALBERTUS MAGNUS. It is a matter of controversy whether this celebrated scholar derived his laudatory name from the admiration of his contemporaries, or whether it was a Latinized form of the surname Groot, or Grot. He was born at Lauingen, in Suabia, according to some in 1205; according to others in 1193. In 1222 he entered the order of Dominicans. During a long series of years he gave public lectures at Cologne, which were frequented by the principal scholars of the age; and he filled many places of trust and dignity. He was, however, unambitious of worldly honours, and he resigned even a bishopric which was forced upon him by the Pope, that he might enjoy the retirement of his cell, teach, and compose books. He died in 1280. His works form twenty-one volumes in folio; and are devoted to logic, physics, metaphysics, and theology. The writer of the best life we have seen of Albertus Magnus, says, 'When his influence in promoting the progress of knowledge in Europe is taken into account, he being the first to present the students of the middle ages with an encyclopædia of knowledge, it is easy to enter into the feelings of those who bestowed upon him the name of Great. There are not many among those to whom that absurd epithet has been applied, who have so well deserved it.' (*Biographical Dictionary of the Society for the Diffusion of Useful Knowledge*, vol. i. p. 698.)

ALBIGENSES, a religious sect which appeared in the south of France in the twelfth century, and was the object of long and cruel persecutions and wars. The denomination of Albigenses includes more than one sect, holding different opinions, but all agreed in considering the authority assumed by the popes in spiritual matters, as well as the discipline and ceremonies of the Roman church, as unlawful and erroneous. Pope Innocent III. sent two legates, Peter of Castelnau and one Rainier or Raoul, both Cistercian or Bernardine monks, as his legates to France, in order to extirpate all these heresies. Dominic, a Spaniard, and the founder of the order of preachers, returning from Rome in 1206, fell in with the legates, and volunteered his services in the same cause. In 1208, Castelnau, one of the legates, who had become odious by his severities, was murdered near Toulouse; and Innocent III. on this proclaimed a regular crusade against the

Albigenses, and against Raymond VI., count of Toulouse, who supported them. All the French barons were summoned to take the field; and Simon, count of Montfort, was appointed chief of the expedition, under the direction, however, of Arnald, abbot of the Cistercians, and the Pope's new legate. The war began in 1209, and lasted many years, attended by circumstances of the greatest ferocity. Montfort lost his life at the siege of Toulouse in 1218, and Raymond, his adversary, died in 1222. The war, however, was resumed by the sons of the two antagonists; until Pope Honorius III., alarmed at the successes of Raymond VII., induced Louis VIII., king of France, to take the field in person. At last the Count of Toulouse, pressed on all sides, made peace with the king in 1229. This was a mortal blow to the Albigenses. Raymond himself died some years after; and in him the house of the Counts of Toulouse became extinct, and its territories reverted to the French crown. The extermination of the Albigenses in the south of France was complete; the country was devastated; and the language and poetry of the Troubadours became also extinct. The best account of the Albigenses is found in the 'General History of Languedoc,' published at Paris in 1730. (Mosheim, *Ecclesiastical History*, Thirteenth Century, part ii.)

ALBINATUS JUS. [AUBAINE.]

ALBI'NOS, a word applied by the Portuguese voyagers to the white negroes whom they found on the coast of Africa. The name is now used to designate any individual who exhibits peculiarities similar to those observed in the white negroes, among whatever race or in whatever country the variety may occur. The most striking peculiarities of Albinos consist in the colour of their skin and in that of their hair and eyes.

Their skin is of a pearly whiteness, without any admixture whatever of a pink or a brown tint. It is often not soft and smooth in proportion to its whiteness, but rough, dry, and harsh. The whiteness of the hair always corresponds to the whiteness of the skin. Not only the hair of the head, but also that of the eyebrows, eyelashes, beard, and even the soft down that covers the external surface of the body, has the same unnatural whiteness.

With this whiteness of the skin and hair is connected a still more striking peculiarity,—namely, a disagreeable redness of the eyes. That part of the eye called the iris is of a pale rose colour, while the pupil is intensely red: in a word, the eye is exactly similar to that of the ferret. From this conformation of the eye a strong light cannot be borne, and even the full glare of day appears to excite some degree of uneasiness, and the eyes are generally weak, tender, and watery. It would seem that the Albino is both physically and mentally somewhat weaker than other men. All accounts agree in representing his physical strength as inferior to that of persons of the ordinary conformation.

It would seem that there is a greater tendency to the formation of this variety in some parts of the world than in others. It is more common among the African and the Indian tribes than among the European people. It is common in both sexes, but it would appear to be somewhat more frequent in males than in females.

The immediate cause of the condition of the hair and skin is the absence of the ordinary deposit of colouring matter in the skin; the redness of the eye is owing to the absence of the colouring matter from certain membranes of the eye. The posterior surface of the iris, and the surface of the membrane of the eye termed the choroid coat, are both, in the natural state, covered with a dark-coloured pigment termed the *pigmentum nigrum*. The blood-vessels that enter into the composition of the iris and the choroid membrane are exceedingly numerous; but when the eye is natural, these blood-vessels are concealed by the black pigment of which we have just spoken. When, however, this pigment is absent, there is nothing to conceal these vessels from the view; they are seen filled with red blood, and they are so numerous as to give to these parts of the eye the appearance of intense redness. In the Albino, the colouring matter of the eye, like that of the skin, is wholly absent, and the eye appears intensely red because the blood-vessels of the most highly vascular part of the organ are left entirely naked and exposed to the view. Of the cause of this peculiar affection of the organs in question we are wholly ignorant.

Some writers represent the peculiarities which distinguish the Albinos as altogether the result of disease. But as far as can be judged from external appearance, and from their accounts of their own feelings, the white negroes appear perfectly healthy; and we know that European Albinos exhibit not a single mark of any disease whatever. It is also certain that domestic animals which exhibit varieties perfectly analogous to those of the human Albinos are free from disease, as is familiarly known with respect to the sheep, pig, horse, cow, dog, cat, rabbit, &c. It is remarkable, however, that it has never been seen in any cold-blooded animal.

ALBI'NUS, BERNARD SIEGFRIED, one of the most celebrated anatomists of the eighteenth century, was born at Frankfort, in the year 1697. The position of his father, who was professor of the practice of medicine in the university of Frankfort-on-the-Oder, afforded him the advantage of studying from his early youth under the greatest masters of the age—Boerhaave, Ruysch, and Rau—and after completing the usual course of education at Leyden at a very early period, he visited France, where he formed an intimate acquaintance with Winslow and Senac. So well did he avail himself of these opportunities of acquiring knowledge, that he was elevated, at the age of twenty, to the anatomical professorship of Leyden. This chair he occupied without interruption and with extraordinary celebrity for the space of half a century. He was a most laborious and indefatigable dissector; and excelled in making anatomical preparations. When not occupied in teaching, his hours were devoted to the careful dissection of different parts of the body, the faithful representation of which he secured by engaging the most excellent painters that he could procure, and by constantly superin-

tending and directing their drawings. He published correct and elegant editions of the works of Harvey, the 'Anatomy' of Vesalius, and of Fabricius of Acquapendente, and the fine 'Anatomical Plates' of Eustachius. (For a list of the works of Albinus, see Watt's *Bibliotheca Britannica*:)

A'LBION. Great Britain and Ireland were known to the Romans by the general appellation of the Britannic Islands, but Great Britain was designated by the particular name of Albion or Alwion, and Ireland by that of Ierne, Iouernia, or Erin. Cæsar does not use the word Albion: his name for England is Britannia. Pliny says ('Hist. Nat.' iv. 16), 'the name of the island *was* Albion, the whole set of islands being called Britannic.' The word Albinn is still the only name by which the Gaels of Scotland designate that country; and the word signifies in the Gaelic language *white* or *fair* island. The word *alb* itself is said not to be now in use in the Gaelic, but it is probably the same root that we find in the Latin adjective *alb-us*, and in the word 'Alps.' *Alb*, however, is found in Armstrong's Gaelic Dictionary. The termination *i*, *inn*, or *innis*, signifies 'island.'

The name of 'Albion' was probably given to England by the Gaels of the opposite coast, who would be struck with the chalky cliffs that characterize the nearest part of Kent.

(*Thoughts on the Origin, &c. of the Gael*, by James Grant, of Corrimony; Armstrong's *Gaelic Dictionary*.)

ALBION, NEW. This name was given by Sir Francis Drake to the entire province of California and part of the adjoining north-west coast of North America, which he visited in the month of June, 1579. The part of this coast since known as New Albion was less extensive, and was limited, by Humboldt and other geographers, to that portion of the country which is situated on the mainland, between 43° N. lat. and 48° N. lat. The entire country, from 42° N. lat., which is the northern boundary of Mexico, to 54° 40′ N. lat., which is the southern boundary of the Russian possessions in America, and from the Rocky Mountains to the Pacific Ocean, has now received the name of *Oregon*, which is the native Indian name of the river which the Americans have since called the Columbia River. [OREGON.]

ALBITE. [CLEAVLANDITE.]

ALBOIN, one of those northern princes who established kingdoms in Italy upon the ruins of the Roman empire. He was the son of Audoin, king of the Lombards. [LOMBARDS.] Tracing their origin from Scandinavia, the Lombards were settled, at the time of which we speak, about the middle of the sixth century, in Pannonia. Here they became engaged in hostilities with the rival monarchy of the Gepidæ; and in the early stage of this contest, Alboin, then a youth, signalized his courage, strength, and skill in arms, and the prince of the Gepidæ fell by his hand. His character, however, is marked by extreme ferocity. He obtained his wife Rosamond, sister of the prince of the Gepidæ he had slain, by a war with her father, whom he also slew, and had his skull converted into a drinking cup; and his invasion of Italy in 568 was marked with similar savageness. He, however, fixed the seat of his empire at Pavia, which remained for some ages the chief city of the Lombard dominions; and, by the justice and mildness of his government, secured the affections of his people. It is possible that, had not his reign been limited to the short space of three years and a half, he might have mastered the whole peninsula. The conquest of the Lombards was in some sort the epoch of the regeneration of the people. Independent principalities, communities, and republics began to be formed on all sides; a principle of life was infused into the country which had been long buried in lethargic slumber. The series of monarchs who succeeded Alboin were long distinguished by their prudence, and by making the laws their rule of conduct.

Alboin's life was terminated by domestic treachery. Having drunk deep at a feast with the chief of his countrymen, he ordered the skull of Cunimond to be carried to Rosamond, with his request that she would taste the wine, and rejoice with her departed father. The queen obeyed, but she determined on revenge; and caused him to be assassinated in his chamber.

(Paul Warnefrid, *De Gestis Langobardorum*; Muratori; Gibbon, chap. xlv.)

ALBORAK, the name of an imaginary animal of a shining whiteness, on which, according to the Moslem tradition, Mohammed performed his journey from the temple at Jerusalem through the heavens.

ALBORNO'Z, GIL CARRILLO DE, a celebrated cardinal, was born at Cuenca, about the beginning of the fourteenth century, and became Archbishop of Toledo. In those days churchmen were sometimes warriors, as well as politicians. Albornoz saved the life of his king, Alphonso XI., in an engagement with the Moors at Tarifa; was at the siege of Algesiras; and was dubbed a knight by the king himself. Driven from Spain by his conscientious opposition to the criminal life of Peter the Cruel, he sought refuge in Avignon with Pope Clement VI., and was created a cardinal. In 1353 he was appointed legate, and entrusted with the important mission of the reconquest of the papal states. When Urban V. came to Italy, Albornoz went to meet him at Viterbo, and the pope called his legate to give him an account of his administration. The cardinal ordered a cart loaded with old keys and locks to be brought into the court of the house, and showing it to the pontiff, said, 'I have spent all my funds in placing your holiness in possession of all the towns and castles, the keys of which I present to you.' The pope, sensible of his ungrateful mistrust towards a man who had done so much for him, embraced him cordially, and always after entertained for him the greatest esteem. Having been appointed legate of Bologna, he gave to that city a new constitution, and at his own expense founded there a college for the Spaniards. Cardinal Albornoz died at Viterbo in 1364.

ALBOURS, or ALBURZ. [ELBURZ.]

ALBUE'RA, or ALBUHERA, a village on the main road from Seville to Badajoz, at a distance of 16 miles S.S.E. of the latter. A battle

was fought here on the 16th of May, 1811, between the French under Marshal Soult and an allied force of British, Portuguese, and Spaniards under Marshal Beresford. The French were defeated, and retreated to Seville.

ALBUFERA, an Arabic word meaning the water, is the name of several lagunes on the coast of Spain and Portugal. The most considerable of these is the Albufera of Valencia, which is 11 miles long and nearly 3 broad. A tongue of land separates it from the sea, with which there is a communication by a small canal, that can be opened and shut at pleasure. It abounds in wild fowl and fish, and is a source of considerable revenue. This revenue, which in 1808 was attached to the crown, was afterwards given to the Duke of Wellington, as a reward for his services in Spain. In 1820, the lagune was farmed at 60,000 piastres, which is about 12,000*l.* sterling. In the neighbourhood large quantities of rice are grown. Ague is common in the environs of the lagune. (*Géographie Universelle;* Balbi, *Géographie.*)

ALBUM (White), was a tablet on which the Roman prætor's edicts were written; it was put up in a public place. It was probably called album because the tablet was white. The word was also used to signify a list of any body of persons, as of the senators (Tacitus, 'Ann.' iv. 42), and of the judices.

A book which is intended to contain the signatures, or short verses, or other contributions of persons of note or supposed note, is now called an album. The name is also given to a book which is merely intended as a repository for drawings, prints, verses, and such matters.

ALBU'MEN forms a constituent principle of plants and animals; and its essential properties are found to be the same from whichever kingdom of the organised world it is derived.

Vegetable albumen is found in the green feculæ of plants in general; in the fresh shoots of trees; in the sap of many plants; in the bitter-almond, the sweet-almond, and the emulsive seeds in general; but it exists in the greatest abundance in such vegetables as ferment without yeast, and afford a vinous liquor. It is coagulable by heat; before coagulation it is soluble in cold water; after coagulation it is insoluble in water; it is insoluble in alcohol; sparingly soluble in acids; abundantly soluble in alkalies, and from the alkaline solutions it is precipitated by acids.

Albumen exists much more abundantly in animals than in plants. It forms a constituent both of the animal fluids and solids. Of the animal fluids, it forms an essential part of the serum of the blood; it abounds in the fluid that moistens the surface of the internal cavities of the body and of the organs they contain, and it exists in large quantity in the watery fluid poured out into those cavities in the disease termed dropsy. White of egg is nearly pure albumen: when liquid it soon putrefies; but if carefully dried it may be long preserved. In the animal solids, albumen forms the principal part of the skin, of fibrin, the basis of muscle or flesh, and of the organs called glands.

The most remarkable property of albumen is its power of solidifying under circumstances which would rather tend to liquefy than to solidify most substances. White of egg shows white fibres at a temperature of 134° F., solidifies at 160°, and becomes horny at 212°. When mixed with water, a higher temperature is required for coagulation. Albumen is precipitated in white fibres, by agitating white of egg with alcohol. Galvanic action will also coagulate albumen. Many of the stronger acids and salts will have the same effect; and so delicate a test of the presence of this substance is the bichloride of mercury, or, as it is commonly called, corrosive sublimate, that if a single drop of a saturated solution of corrosive sublimate be let fall into water containing only the two-thousandth part of albumen, it will occasion a milkiness in the water, and produce a curdy precipitate.

Albumen furnishes ammonia when decomposed by heat; and from its property of coagulation it is useful in clarifying liquids, by entangling all the substances not held in solution, and bringing them to the surface.

Albumen has been analysed by Gay-Lussac, Thénard, Prout, and Mülder. According to Mülder, 100 parts of animal albumen consist of, carbon, 54·84; hydrogen, 7·09; oxygen, 21·23; azote, 15·83; phosphorus, 0·33; sulphur, 0·68. Vegetable albumen gave almost exactly the same results by analysis. Liebig and other continental chemists have recently discovered a remarkable similarity between albumen and other organic principles of plants and animals; for which see PROTEIN.

Medical Properties.—The most interesting application of albumen is its employment as an antidote against one of the most virulent of the mineral poisons, viz., corrosive sublimate, or bichloride of mercury. For this poison, albumen is a sure and effectual antidote. The world is indebted to Orfila, the celebrated Parisian toxicologist, for this discovery. It would seem as the result of several experiments, that the white of one egg is required to render four grains of corrosive sublimate innoxious. The efficacy of this antidote has been fully established in the human subject. Several cases are on record in which this poison was taken both by accident and design, in which the immediate and free administration of the white of eggs disarmed it of all noxious influence.

ALBU'MEN, in plants, is the substance which in some seeds is interposed between the embryo and their coat. This term, on account of its use in Chemistry, is objectionable, and some botanists employ the word *perisperm*, to express the same part.

This substance in the beginning is of a pulpy nature, and is the matter in which the young embryo first makes its appearance; in this state it is present in all plants.

Botanists find its presence in abundance, or its total or almost total absence, a character of very great importance in distinguishing the different tribes of plants.

ALBUQUERQUE, ALFONSO, (or, as the

Portuguese write his name, AFFONSO ALBOQUERQUE,) the greatest of those captains who built the short-lived fabric of Portuguese empire in India, was born at Melinda, in Africa, A.D. 1452. He was the second son of Gonzalvo d'Albuquérque, lord of Villaverde, descended of a bastard branch of the royal family of Portugal. In his youth he was first esquire to King John II.; but he first becomes well-known to us in the year 1503, when, in conjunction with Francisco Albuquerque, his cousin, or uncle, he conducted a fleet to India, and secured the King of Cochin on his throne, which had been endangered by his powerful neighbour, the Zamorin of Calicut. In gratitude for their services they obtained leave to build a fort at Cochin, which, according to the Portuguese authors, is to be considered as the foundation of their national empire in the East. Francisco Albuquerque was wrecked on his voyage home. Alfonso reached Lisbon safely, July 16, 1504, and was favourably received by the king, who sent him out to India again, in 1506, in command of a squadron of five ships, composing part of a fleet of sixteen, under the orders of Tristan da Cunha. For a time the generals carried on a prosperous warfare against the Moorish cities on the eastern coast of Africa. Da Cunha, sailing for India, left Albuquerque to command in the Arabian seas; who appeared before Ormuz, Sept. 25, 1507, having already in his course reduced most of the chief trading towns between the Red Sea and the Persian Gulf. Zeifadin, king of Ormuz, was obliged to submit, after the shipping and part of the town had been burnt. Cogi-Atar, his prime minister, however, concerted a revolt, which proved successful. Albuquerque was compelled to evacuate the place; and after an unsuccessful attempt to reduce it by famine, returned to the island of Socotra, off Cape Guardafui, leaving his chief purpose unaccomplished.

Being joined by three ships bound to India, he set sail for the Malabar coast, in 1508. He had received a secret commission, authorizing him to supersede Don Francisco d'Almeida, governor of the Indies, when the period of his commission should have expired. On arriving at Cananor he informed Almeida of this; but the governor received him very coldly, declined either to surrender the government or to accept his services in any subordinate capacity, and finally threw him into prison, where he remained three months. The arrival of the Grand Marshal of Portugal, with a powerful fleet, restored him to liberty. Almeida returned home, and Albuquerque was acknowledged General and Commander-in-Chief in India. This fleet was intended to act against the Zamorin of Calicut, whose long-continued hostility had made him very obnoxious to the Portuguese. The attack on Calicut failed. The Marshal was killed; Albuquerque, in attempting to rescue him, was desperately wounded; and the Portuguese were forced to return to their vessels with considerable loss, having done much injury to the town and shipping.

The court of Portugal had now divided their Indian government into three portions – one comprehending the eastern coast of Africa and the coast of Asia, from the tropic of Capricorn to Cambay; the second, Hindustan, which was allotted to Albuquerque; the third, the rest of India east of the Ganges. Its chief object was to prosecute its conquests in the Red Sea, and to monopolize the Indian trade by destroying that carried on between India and Egypt. With this view the greater part of the reinforcements sent to the East were ordered to act in the Red Sea, under the command of George d'Aguiar; and Albuquerque thus seemed placed in a secondary command: but by good fortune and good policy he succeeded in frustrating, in some degree, the designs of the court, and contrived to gain nearly as extensive authority as his predecessors had held. After some intrigues, to avoid assisting his unsuccessful coadjutors, he resolved to sail to Goa; and that rich and prosperous city fell into his hands almost without resistance. His energy may be judged from the rapidity with which his enterprizes were conducted. He appeared before Calicut, January 2, 1510, and though severely wounded there, he entered Goa the 17th February following. But he was unable to hold it, and he finally left the harbour, August 15, 1510. The history of this siege of Goa is full of interest, and will repay the trouble of perusing it at length.

In the course of the year strong reinforcements were sent out from Portugal, and, at the same time, Lemos, one of the three governors, was recalled, and his command made over to Albuquerque. The same autumn Albuquerque attacked Goa a second time, and carried it by storm, Nov. 25. Early in the next year he meditated new conquests. A detachment of the fleet which had been sent out in the preceding year, was especially ordered to proceed to Malacca under the command of Diego de Vasconcellos. This Albuquerque forcibly prevented, seizing Vasconcellos and sending him back to Portugal, and putting three of his officers to death. As soon as Vasconcellos was removed, Albuquerque sailed himself on the expedition against Malacca, which hitherto he had put off on different pretexts, and, with some difficulty, captured the town, which was given up to plunder. Immense wealth was obtained. The fifth of the booty, which was set apart for the king, was valued at 200,000 gold cruzadoes, exclusive of naval and military stores, among which 3000 cannon were said to have been found. In this expedition his troops amounted only to 800 Portuguese, and 200 Malabar auxiliaries: the Malayan prince is said to have had 30,000 men under arms.

Albuquerque had it much at heart to establish the Portuguese power as firmly at Malacca as at Goa. He built a citadel, coined money, established a new system of law and police, and lost no opportunity of conciliating the natives. He received and sent embassies to the kings of Siam, Pegu, and other neighbouring princes, who were deeply impressed by the rapid growth of the power of these European strangers. After remaining at Malacca near a year, he set sail for Goa, which in his absence was hard pressed by Idalcan, where, after a shipwreck and some other vicissitudes, he arrived, September 13, 1512. He was received

with lively joy; his presence soon removed all cause for disquietude, and established the power of the Portuguese more firmly than ever. He relaxed the king's dues, and gave every encouragement to commerce, and Goa soon became the most flourishing city of the Portuguese dominions.

The orders of the court were still urgent to prosecute the war in the Red Sea; and seeing India quiet, he now, in 1513, directed his efforts to the reduction of Aden [ADEN], a considerable commercial town of Arabia. His force, much larger than usual, consisted of twenty ships, 1000 Portuguese, and 400 Malabar troops; (Barros, Decad. II. lib. vii. cap. 9,) but he reaped neither honour nor profit by this voyage. Repulsed at Aden, he entered the Red Sea, leading the first European fleet that ever sailed in its waters; but he experienced much hardship and danger from heat, want, and difficulty of navigation, and returned to India without striking a blow.

His last enterprize was a second attempt upon Ormuz, in which he succeeded (1507) without recourse to arms, by the effects of terror and negotiation; and the place remained in the hands of the Portuguese till it was taken from them in 1622, by the English and Shah Abbas. [ABBAS.] Soon after the accomplishment of this favourite wish he fell sick, and was obliged to return to Goa. At the mouth of the Gulf he met a vessel bearing despatches from Europe. They signified his recal; that Lopez Soarez d'Albergaria was nominated his successor; and that Diego Pereira and Diego Mendez de Vasconcellos were appointed to high offices. His illness, aggravated by vexation, proved fatal. He died December 16, 1515, in his 63rd year. His body was conveyed to Goa, and buried in the church of Our Lady, which he had built; and in future years—a touching testimony to the uprightness of his government—Moors and Indians repaired to his tomb, as to that of a father, to implore redress from the injustice and tyranny of his successors. His bones, more than fifty years after his death, were transported to Portugal.

(The second decade of Barros's *History of the Portuguese Conquests in the East* is entirely occupied by the transactions of which we have here given a short sketch. Those who do not read Portuguese may consult Maffei, *Historia Indica;* Lafitau, *Hist. des Conquêtes des Portugais dans le Nouveau Monde.*)

ALBURNUM, *in plants*, is that part of the stem of trees which timber merchants call *sapwood*. It is the newly-formed unchanged wood lying immediately below the bark, and is always of a very light colour. [AGE OF TREES.] It consists of little besides vegetable tissue; in which respect it differs from *heartwood* or *durámen*, which is vegetable tissue combined with solid secretions, the nature of which varies with species.

While many plants have the alburnum and heartwood distinctly separated, there are others, technically called white-wood trees, which consist of nothing but alburnum. This arises from their not forming any solid secretions which can give durability to the central parts; hence all such trees are quickly perishable, and are generally unfit for any but temporary purposes.

ALBY, or ALBI, a town in France, the capital of the department of Tarn, stands on the left bank of the Tarn, in 43° 55′ N. lat., 2° 8′ E. long., 400 miles S. of Paris. It is the seat of an archbishop, has tribunals of first instance and of commerce, a college, several literary and scientific societies, a museum, a collection of models for agricultural implements, and a public library. The houses of the town are well enough built, but the streets are narrow and ill laid out. Among the public buildings the gothic cathedral is remarkable for boldness and elegance; the interior is adorned with old paintings, and it has one of the best organs in France. Alby possesses a fine promenade planted with trees, called La Lice, just outside the city, formed by a terrace, and commanding a view of the adjacent country. The number of inhabitants is 12,400; they have some manufactures of linen, cotton, hats, cord, and wax-lights. The arrondissement of Alby contains 8 cantons, 105 communes, and 86,817 inhabitants. The neighbourhood of the town, formerly the district of Albigeois, is fertile in corn, grapes, plums, and saffron; many sheep are fed, and a considerable trade is carried on in dried fruits, wine, and coarse cloth. This district is well wooded; coal is found.

The name Albigeois, above-mentioned, is derived from the Latin form of the name of the town, *Albiga*, from which, likewise, it is said, the early reformers of this part took the name of Albigenses.

ALCA (Cuvier), the auk, a genus of web-footed sea birds, belonging to the family Alcadæ. Of this genus as at present restricted, two British species are known; the Great Auk, *Alca impennis*, and the Razor-bill, *Alca torda*. The former of these is utterly destitute of the powers of flight, but uses its short rigid wings as oars. It breeds on the rocky shores of Iceland, Greenland, Spitzbergen, &c.

ALCÆUS, the earliest of the Æolic poets, and one of the most celebrated lyric poets of Greece. Only a few fragments of his poems remain. Several passages in the odes of Horace are manifest imitations, or nearly translations of some of these extant fragments. Alcæus was a native of Mityléne, in Lesbos, the contemporary and countryman of the poetess Sappho. The chief events of his life belong to the period between B.C. 615 and 602, and relate to the political history of his native island. Of his life only one anecdote worth relating has been preserved: in a battle with the Athenians he threw away his armour (a mortal disgrace according to Greek notions of honour), and sought safety in flight. From Alcæus, the Alcaic, one of the lyric metres of Horace, derives its name. The most striking fragment of Alcæus is one which has been finely expanded by Sir W. Jones. The fragments of Alcæus are collected in the 'Cambridge Museum Criticum,' vol. i. p. 421, and the collection is reprinted in Gaisford's 'Minor Greek Poets,' Leipzig, 1823.

ALCAIDE or ALCAYDE, a Spanish word formerly used to denote the governor of a fortress

or a castle, and also the keeper of a gaol. It is derived from the Arabic *Al-Kayid*, 'the head' or leader.

ALCALA', a name common in the southern parts of Spain, is derived from the Arabic *El-Calaat*, 'the castle.'

ALCALA' DE HENA'RES, a town of Spain, in New Castile, is situated in a fine plain on the river Nares or Henares, whence it derives its name; it stands in 40° 29′ N. lat., 3° 23′ W. long., 13 miles E.N.E. of Madrid. The population is 5000. About a mile from its present situation stood the ancient Roman town, Complutum, at the confluence of three small rivers. This town was destroyed about the year 1000 of the Christian æra. The present city was built in 1083, and surrounded with a strong wall. It is also called Alcalá de San Justo, from the saint of this name who suffered martyrdom there. The Moors possessed it until the beginning of the twelfth century, when it was conquered by Don Bernardo, archbishop of Toledo. It is celebrated for its university, which was founded in 1510, and richly endowed by Cardinal Ximenez. It was in this university, and at the expense of its founder, that the Polyglot Bible, called the Complutensian Bible, was edited. At the distance of about a mile from the city stands a bridge upon the river Henares, from which the towers and domes of thirty-eight churches and nineteen colleges present a magnificent appearance. The Archbishop of Toledo has a superb palace in this town. The cathedral is a fine gothic building, and possesses several good paintings. In the college of St. Ildefonso is seen the sepulchre of Cardinal Ximenez, wrought in alabaster by Domenico Fiorentino. The environs of Alcalá are pleasant and productive. Its climate is mild, but rather cold in winter. This city is the birthplace of Miguel Cervantes, author of Don Quixote, and of Solis, the historian of America. (Miñano, *Dicc. Geografico-Estadistico de España*; Ponz, *Viage de España*; Mariana.)

ALCALA' LA REAL, a town in the province of Jaen, in Andalusia, on the river Gualcoton. The district around is productive in wine and fruits; it is 2700 feet above the level of the sea, and is the highest ground between the Gundalquivir and Grenada. Alcalá has two churches, and an hospital: its population is 9000. It is 20 miles W.S.W. from Jaen.

ALCALDE, in Spain, is a judge appointed by the government, or elected by the towns, to administer justice within the district under his jurisdiction. The word is a corruption of the Arabic *El-Cadi*, 'the judge;' others derive it from the root *calede*, 'to preside.' There are several denominations of *alcaldes*. The *Alcalde de Alzadas* is a judge appointed by the government or the lord of the district, to whom the parties may appeal from the decision of the *Alcaldes Pedaneos*, or justices of the peace. The *Alcaldes de Casa y Corte*, is a bench of judges, who singly or jointly try all criminals within the court and twenty miles from it, or sixty, in cases of robbery. The *Alcalde Mayor* is a judge appointed by the king or by the lord of the town to act as an assessor to the *Alcaldes* or *Corregidores*, who are not lawyers. The *Alcaldes Pedaneos* are elected by the people yearly; they preside at the common-council, or *Ayuntamiento*, and act as magistrates. The parish officers are also called *Alcaldes*, and are distinguished by appellations expressing their office. (*Diccionario de la Acad.*; Garibay; Covarrubias.)

ALCA'MENES, an ancient sculptor, native of Athens. He was the pupil of Phidias, and lived therefore in the middle of the fifth century B.C., and later. Phidias, Alcamenes, and Polyclétus were the three greatest sculptors of ancient Greece; Alcamenes survived Phidias some time, as he was still living in the 95th Olympiad according to Pausanias, about 400 B.C. The works of Alcamenes, which were in marble and bronze, are noticed by Pliny in his 'Hist. Nat.,' lib. xxxiv. and xxxv., by Lucian, by Pausanias, by Cicero, by Valerius Maximus, and by other ancient writers. Alcamenes contended with the greatest sculptors of his time for prizes offered for public monuments. It is stated that he thus competed with his master, Phidias. The subject was a statue of Minerva; and the work of Alcamenes was at first, on account of its proportions and higher finish, preferred to the work of his master; but when fixed in their destined places, the superiority of the statue of Phidias was evident; the latter gained effect, the former lost it. In this instance Phidias gave Alcamenes a lesson, from which modern artists might derive a benefit. The most celebrated work of Alcamenes was a Venus, in the temple of Venus Urania, at Athens.

ALCA'MO, a city of Sicily, 25 miles W.S.W. of Palermo, and within three miles of the Gulf of Castel-a-Mare. The town is considered healthy, and has a population of 13,000. The district of Alcamo is divided into four cantons: Alcamo, Castel-a-Mare, Calatafimi, and Gibellina. An old poet of the twelfth century, Ciullo d'Alcamo, takes his name from this city. Near the town are the ruins of Segeste, and the remains of an ancient temple, the front of which is in good preservation. (*Géographie Universelle*; Balbi, *Géographie*.)

ALCA'NTARA, a fortified town in Spanish Estremadura, on the southern bank of the Tagus, 39° 44′ N. lat., 6° 43′ W. long., is 230 miles by the road W. by S. from Madrid. The number of inhabitants is about 3300. Under the Romans, Alcantara bore the name of Norba Cæsarea, and was distinguished by a beautiful bridge of six arches over the Tagus, built in the reign of Trajan. When the Arabians became masters of this part of the peninsula, the Roman name was changed to Al-Cantarat-al-Seif, *the Bridge of the Sword*; and hence the modern name. The bridge of Trajan, after having stood for seventeen centuries, was partly destroyed by the British during the war in Spain, June 10, 1810. The town gave name to the military order of Alcantara, of which it was the head quarters. (Miñano.)

ALCA'NTARA, KNIGHTS OF ('la Caballeria de Alcántara'), a military and religious order of Spain, so called from the town upon the

Tagus. This order owes its origin to two brothers, who, about 1156, in the reign of Ferdinand II., of Leon and Galicia, assisted by a body of knights from Salamanca, seized a hermitage in this valley called San Julian del Pereyro, which they converted into a fortress; and the institution was confirmed by the Pope Alexander III., in 1177. When Alcantara was recovered from the Moors in 1213 by Alonzo IX. of Leon, the defence of it was soon transferred to the knights of San Julian del Pereyro, who shortly afterwards assumed the title of Alcantara. Thirty-seven masters in succession commanded the noble order of Alcantara; and, like those of Calatrava and Santiago, they were at times almost too powerful for the monarchs of Spain. In 1494 or 1495 Ferdinand, the husband of Isabella, who had already assumed the command of the other two orders, prevailed upon Juan du Zuñiga, son of the Duke of Arévalo, to resign the grand-mastership of Alcantara. From that time the dignity has remained in the crown of Spain.

ALCA'RRIA, the name given to a portion of the province of Guadalajara, in Spain. The word *Alcarria* is Arabic, and means a collection of farm-houses; and the district so called contains several villages, the largest of which are Guadalajara, Huete, Brihuega, and Cogolludo. The territory, which is 4200 feet above the level of the sea, consists of hills enclosing beautiful and fertile valleys, watered by rivulets, which spread fertility and abundance throughout the plains. Both the mountains and the valleys are covered with nutritious herbs, which supply with food the numerous flocks of Merino sheep, that in the summer months leave the scorched plains of Estremadura to seek the green and rich pasturages of the mountains of Castile. The olives, wines, and honey of Alcarria are excellent. There are no large proprietors, but every one has some landed property, which he himself cultivates, according to his means and ability, but necessarily on a small scale. The rivers which traverse the district are the Nares or Henares, the Tagus and the Tajuña. There are mineral waters, of which, those of Trillo and Sacedon are the most frequented. (Miñano, *Diccionario Geográfico.*)

ALCARSIN and ALCARGIN. [CACODYL.]

ALCE'DO, a Spanish officer, who published a 'Geographical and Historical Dictionary of America and the West Indies,' in five small quarto volumes, at Madrid, 1786-9. It was suppressed by the government, and is now, in the original form, of extreme rarity. An English translation was published by G. A. Thompson, Esq., with additions and corrections, in five quarto volumes, 1812-15.

ALCE'DO (Linn.), a group of birds of which the European kingfisher is the type. This Linnean genus now constitutes an extensive family (*Halcyonidæ*), widely distributed. One species of kingfisher only, *Alcedo Ispida*, is indigenous in our island: it is the most brilliant of British birds.

ALCES. [ELK.]

ALCESTER, a parish and market town in Warwickshire, situated at the confluence of the Arrow and the Alne. It is 103 miles N.W. from London, and 16 miles W.S.W. from Warwick, in 52° 26′ N. lat., 1° 54′ W. long. Alcester is a place of great antiquity, and the name would indicate that it had been a Roman station; a supposition which is confirmed by the great numbers of Roman coins, urns, and other remains, which have been found on the spot. Alcester has been generally supposed to be the Alana of Richard of Cirencester. It stands on the old Roman way which was called the Ickenild Street. An abbey was founded here in 1140, about half a mile to the north of the town; it was surrounded by the Arrow on the north and east, and by a moat on the other two sides, and was thence called the Church of our Lady of the Isle. There are no remains of this abbey. Alcester contains many old houses, a fine church of considerable antiquity, and a handsome town-house. It has also two stone bridges, one over the Arrow, and the other over the Alne. A free-school was founded here in 1594 by Walter Newport, in a field south from the town. The population of the parish in 1831 was 2405; in 1841 it was 2399. The chief occupation of the inhabitants is needle-making.

ALCHEMY, the pretended art of making gold and silver. The name appears to be derived from the Greek χημεία, chemistry, but the *al* prefixed to it denotes the probability of the Arabic origin of the imposture. Another, and subsequent object of alchemy, was the preparation of a universal medicine. Those alchemists who were supposed to be skilled in the art were termed *adepts*, or *the adepts*.

In the opinion of the alchemists all the metals are compounds, the baser of them containing the same constituents as gold, but mixed with various impurities, which, being removed, the common metals would assume the properties of gold. The change was to be effected by *lapis philosophorum*, or the philosophers' stone, which is commonly mentioned as a red powder possessing a peculiar smell.

It is matter of uncertainty whether there were any alchemists before the Arabians. A treatise on the art is attributed to one Hermes Trismegistus; but Geber, an Arabian physician of the seventh century, is generally named as the earliest authentic writer concerning it. Dr. Johnson supposes that the word *gibberish*, anciently written *geberish*, was originally applied to the language of Geber and his tribe. Geber was an alchemist in the most comprehensive sense of the word; but although his works abound with the most absurd and mystical phrases, yet his chemical labours were directed to the improvement of medicine.

Omitting any mention of less celebrated alchemists, we proceed to notice Albert Groot, usually called Albertus Magnus, who was born at Lauingen in Suabia, in 1205. He imagined that the metals were composed of mercury and sulphur, and accounts for the diversity of them by the difference in the proportion of their constituents and their purity. His writings are in general plain and intelligible. Thomas Aquinas

is asserted to have been the pupil of Albert; he wrote three works on alchemy, which are said to be always obscure, and often unintelligible. Raymond Lully, born at Majorca in 1235, was another alchemist who mixed up a good deal of chemical knowledge with the absurdities of his favourite art. About the same time lived Roger Bacon, who, notwithstanding his great learning and scientific acquirements, was deeply imbued with the mystery of alchemy; this is the more remarkable, because he exposes the absurdity of believing in magic, necromancy, or charms. His chemical and alchemical writings amount to eighteen. [BACON, ROGER.]

Arnoldus de Villa Nova, another adept of the thirteenth century, wrote many works professedly on alchemy: the book entitled 'Rosarium' is probably the most curious, it being intended as a compendium of the alchemy of the day. The second part of this work, which professes to treat of the art of making the philosophers' stone, is stated to be quite unintelligible. Like his predecessors, he considered mercury as a constituent of metals; and professed that he could increase the philosophers' stone at pleasure. Many other alchemists wrote during the thirteenth and fourteenth centuries.

In the fifteenth century appeared John Isaac Hollandus, and his brother or son; and in England one George Ripley; but the most distinguished was Basil Valentine, a German Benedictine monk. Besides his reputation as an alchemist, he possessed very considerable merit as a chemical experimenter, and was much occupied in the preparation of chemical medicines. He first introduced antimony into medicine; and was well acquainted with the various preparations of it. He was of opinion that the metals are compounds of salt, sulphur, and mercury, and that the philosophers'-stone was composed of the same ingredients.

Even so late as the last century there were chemists who believed in the possible transmutation of metals; among whom were Peter Woulfe, and Dr. Price. A more eminent name was that of Bergmann, who, after summing up the evidence for and against the possibility and probability of transmutation, observes, respecting the numerous relations that have been given by writers of apparent veracity, that, 'although most of them are deceptive, and many uncertain, some bear such character and testimony, that, unless we reject all historical evidence, we must allow them entitled to confidence.'

As the philosophers' stone was said to take a great part in the pretended transmutations, Dr. Thomson has endeavoured to discover its probable character. After quoting a description given by one of the alchemists, he states that this mysterious agent could hardly have been any thing else than an *amalgam of gold;* and 'there is no doubt,' he adds, 'that amalgam of gold, if projected into melted lead or tin, and afterwards cupellated, would leave a portion of gold; all the gold, of course, that existed previously in the amalgam. It might, therefore, have been employed by impostors to persuade the ignorant that it was really the philosophers' stone; but the alchemists, who prepared the amalgam, could not be ignorant that it contained gold.'

Geoffroy published, in 1772, an account of the modes in which the alchemists deceived their too credulous dupes; by concealing small fragments, filings, dust, oxides, amalgams, or salts of gold or silver, in the vessels where the operations were carried on; so that gold or silver really appeared in the metallic form, though none but the experimenters knew the trick by which it was effected. Bergmann also explained many of the processes, but with much more faith in their genuineness than Geoffroy.

It is thought by some that the alchemists did injury to chemistry, by bringing it into disrepute; but Dr. Thomson remarks, that a compensation was given in another way:—'As the alchemists were assiduous workmen—as they mixed all the metals, salts, &c., with which they were acquainted, in various ways with each other, and subjected such mixtures to the action of heat in close vessels, their labours were occasionally repaid by the discovery of new substances, possessed of much greater activity than any with which they were previously acquainted . . . . Thus the alchemists, by their absurd pursuits, gradually formed a collection of facts, which led ultimately to the establishment of scientific chemistry.'

(Dufresnoy, *Histoire de la Philosophie Hermétique;* Thomson, *History of Chemistry.*)

ALCIBIADES, the son of Cleinias, an Athenian, of a rich and illustrious family, became an orphan at an early age, and was under the care of his uncle Pericles. After the death of Pericles, Alcibiades being then but a child, Nicias and Cleon succeeded to a divided influence in the state. Alcibiades soon came forward in public affairs, and at first he was inclined to cultivate the goodwill of Sparta, between which and his own family an ancient hereditary friendship had existed: but the Spartans chose rather to connect themselves with Nicias, and Alcibiades became their enemy.

His first opportunity of thwarting Sparta, and his first prominent appearance in public life, occurred in B.C. 421. A truce had been concluded between Sparta and Athens; but difficulty arose in executing the terms of the treaty. Ambassadors came from Sparta with powers to settle all matters in dispute; and at the same time there came ambassadors from Argos, which was always jealous of Sparta, to solicit the Athenians to join their alliance. Alcibiades persuaded the Spartans, who had stated to the Senate of Five Hundred that they had full power to settle all differences, not to disclose to the general assembly of the citizens what their powers really were. They followed his advice, but were greatly surprised when Alcibiades reproached them with prevarication, and made an appeal to the people in favour of the Argeian alliance. His proposition was agreed to: and thus Athens was placed at the head of the principal confederacy of Peloponnesus, and Alcibiades became the leading political personage in Greece. His age at this time was from five-and-twenty to thirty. In 419, he was made

Stratégos, or chief military officer of Athens, and during the next three years he took a prominent and active part in the intrigues and war carried on in Peloponnesus.

About this time the Athenian people were chiefly influenced by three men, each of whom was the leader of a strong party; Alcibiades was of the war, or anti-Laconian party; Nicias of those who wished for peace, and a sincere accommodation with Sparta; the third, Hypérbolus, a mob orator of the meanest class, influenced a large proportion of the poorest citizens, who were numerically formidable in the general assembly. Hypérbolus was banished by the form called Ostracism, by the united efforts of Nicias and Alcibiades; but two men of such different character could not act together, and Alcibiades looked for the opportunity of obtaining the sole power by engaging the fickle and greedy Athenians in a foreign war. Alcibiades accordingly proposed to send an armament to protect the people of Egesta in Sicily, who had applied for aid against the powerful Dorian settlement of Syracuse, and to take any further measures which might strengthen the Athenian interest in Sicily. The measure was in vain opposed by Nicias. An Athenian fleet sailed from the Peiræus B.C. 415, under the joint command of Nicias, Lámachus, and Alcibiades. Popular enthusiasm was strongly excited; and the undertaking seemed to promise wealth and victory. There sailed from Athens 100 ships, containing, besides their crews, 2200 heavy-armed Athenian citizens; and the tale of 134 ships, and 5100 heavy armed soldiers, besides slingers and bowmen, was made up by the allies and subject-states. On arriving in Sicily, it was found that little help could be had from the Egestans. Nicias was for returning, Lamachus for laying siege to Syracuse. Alcibiades proposed to enter into negociation with all the cities except Syracuse and Selinus, in the hope of securing a powerful party in the island, before commencing hostilities with those two states. This plan was finally adopted, but before Alcibiades had time to show what his abilities were, he was recalled home; and the war was left to the management of two incompetent commanders. The cause of the recal of Alcibiades was this.

It was usual to place a square block of stone, surmounted by a head of Mercury (Hermes), before the doors of temples and houses in Athens, a relic of more simple times, in which the presence of the god was expected to guard the entrance from violence. Of these Hermæ the greater part were defaced in one night. The act was believed to bode ill to the expedition to Sicily, then in preparation, and high rewards were offered for any information concerning the guilty persons. Alcibiades was suspected of being implicated in the affair, and though he came forward to meet the charge, no immediate investigation was made, and he was permitted to set sail as one of the commanders. But the agitation was kept up during his absence, and the influence of his enemies procured the decree of recal. Alcibiades obeyed the summons, and quitted the fleet in his own trireme; but believing that his death was resolved, he disappeared at Thurium in Italy, in company with other accused persons, and betook himself first to Argos, and then to Sparta.

The value of his services to Sparta was soon shown. The Athenians had laid siege to Syracuse, but at his suggestion a Lacedæmonian force commanded by a Spartan general was sent there; and, in consequence of this timely aid, the besieging force was totally destroyed. At his suggestion also, Decelcia, a town of Attica, within fifteen miles of Athens, was permanently occupied by a Lacedæmonian garrison.

It was the general belief of Greece, that the maritime ascendency of Athens was destroyed by the ruin of the Sicilian armament. The Ionian cities of Asia, which had felt the harshness of her command, seized the favourable opportunity of revolt. The Persian satraps, or governors of provinces, on the coast of the Ægean, were also eager to crush the power of Athens. In B.C. 412, Tissaphernes, satrap of Lydia, and Pharnabázus, satrap of the Hellespontine provinces, both sent to invite the alliance of Sparta. Tissaphernes was preferred through the intrigues of Alcibiades. Sparta as usual was slow in her measures, but the activity of Alcibiades induced Chios, Erythræ, Clazómenæ, Teos, and Milétus to revolt from Athens, and a treaty, by no means honourable to Sparta, was concluded with Tissaphernes.

In the annual change of Spartan magistrates at the end of the year, the friends of Alcibiades went out of office, and were succeeded by the party of Agis, one of the reigning kings, who had personal reasons for disliking Alcibiades. Instructions were sent to the Spartan general in Asia, in whose camp Alcibiades then was, to have him assassinated. Aware of his danger, Alcibiades left the Spartan camp, and repaired to Tissaphernes. But the policy of Alcibiades had a steady view to self interest: his object was always to use his allies for his own purposes. With this view he recommended to the satrap a line of policy which should give no decisive advantage either to Athens or Sparta. By the ruin of Athens his services would become useless to Sparta; by relieving Athens from the fear of Sparta his restoration to his home would become hopeless.

The exertions of Athens, ever since the fatal expedition to Sicily, had been wonderful; but they had nearly drained her treasury. Alcibiades gave the Athenians hopes of an alliance with Persia, on condition of his own restoration and the establishment of oligarchy. The negociation was commenced with the citizens in the Athenian army, then quartered in great strength at Samos. A large proportion of the trierarchs, or captains of ships, who were men of wealth, were favourable to the change. A deputation which was sent from the army to Athens, soon reconciled the people to the measure, and ten commissioners were sent out to treat with Alcibiades and Tissaphernes. But for some reason Alcibiades so managed matters that the commissioners broke off the conference in anger. Still the revolution proceeded. By the new constitution, the supreme authority was vested in five thousand select citizens, and a council of four hundred was appointed

to supersede the old council of five hundred. The council was nominated, but not the select body. No one dared to complain, for the practice of secret murder was carried to a frightful extent. But in the absence of the leading oligarchists, the temper of the army at Samos changed. Thrasybúlus and Thrasyllus, two officers of high character, were appointed to take the command; an oath of adherence to the democracy was exacted from all, and as the general assembly at Athens had been dissolved, the citizens in the army assumed the supreme power, recalled Alcibiades, and appointed him their general. Alcibiades did his country the signal service of preventing a civil war between the oligarchy at home and the army, who were on the point of sailing to Athens to restore the old constitution by force. But in the mean time a revolution was effected at Athens; the supreme power was seized by the five thousand, and Alcibiades was recalled, but he did not yet return to Athens. This revolution and counter-revolution were comprised in the year B.C. 411.

The promises of Persian assistance, which Alcibiades had made, were not fulfilled. But the able conduct of Alcibiades, seconded by Thrasybúlus and Thrasyllus, soon brightened the prospects of the Athenians. At Cynossēma (411) the Peloponnesian fleet was defeated; at Abýdos, in the same year, a further success was obtained; at Cýzicus (410) a still more brilliant victory was gained, in which every ship of the Peloponnesians was taken or destroyed. In the two following years Chalcédon, Byzantium, and the whole Hellespont and Propontis were regained to the alliance or subjection of Athens; and thus the control of the Euxine (Black Sea), and the power of levying duties on all ships passing the straits, was recovered. Alcibiades now led home his victorious armament in B.C. 407. He was received with distinguished favour, and elected commander-in-chief.

After staying four months in Athens, he returned to Asia. The Athenians seem to have thought that he could command success, and a defeat at Notium, where his second in command gave battle during his absence, and contrary to his commands, led to his being superseded. Alcibiades retired from the fleet to the Thracian Chersonese, where he had large possessions. Here the history of his public life ends. He still resided in the Chersonese in 405, and endeavoured to prevent the defeat of Ægospótamoi, which he foresaw from the negligence and incompetence of the Athenian commander; but his advice was disregarded. Athens was taken by the Spartans in the following spring, and Alcibiades, thinking himself no longer safe in the Chersonese, retired into Bithynia. During his abode in Asia, his house was set on fire by a body of armed men, and he himself was killed by a missile from the assassins. He appears to have died in 404, being then at least forty-four years of age.

The intellectual eminence and moral depravity of Alcibiades are alike placed beyond the reach of doubt. Though the pupil of Socrates, he profited little by the moral teaching of his master. His conduct however, subsequent to his recal, seems to have been unexceptionable; and the ingratitude of his countrymen was justly punished by the issue of the war. The rashness of his youth was tempered by experience, and his measures appear to have been vigorous in execution, and prudent and mature in conception. Singularly gifted with the faculty of adapting himself to all men, it was observed that, when at Sparta, he equalled the Spartans in austerity of manners; in Asia surpassed the pomp of the Persians themselves; and he is said, by Plutarch, to have been materially indebted to his powers of pleasing in society, which were such, that 'no man was of so sullen a nature but he would make him merry, nor so churlish but he would make him gentle.'

(Thucydides; Plutarch, *Life of Alcibiades.*)

ALCOHOL. This word is probably of Arabic origin, and is the chemical name of what is sometimes termed *ardent spirit*. Alcohol is the intoxicating principle of beer, wine, and fermented liquors in general; and when they are subjected to distillation, the alcohol and a considerable quantity of water are vaporized and condensed together. The distilled products have different names and properties according to the substances yielding them: thus, brandy is obtained from the fermented and distilled juice of the grape; rum from that of the sugar-cane; whiskey, and what is termed spirit of wine, are usually obtained from barley; which is generally malted previously to fermentation.

It is explained under FERMENTATION, that when that process is going on, a compound of carbon, hydrogen, and oxygen, previously existing in the form of *sugar*, is decomposed, and out of it are formed two other compounds,—*alcohol* and *carbonic acid*. It is in this way that alcohol is obtained for use.

The alcohol of commerce is, however, always mixed with water, on account of the great affinity between them; and it is a difficult chemical process to produce absolute or pure alcohol. One method consists in placing common alcohol in a membranous vessel, of such a nature that water but not spirit will exude through it. Another method consists in evaporating the water by its affinity for chloride of calcium, leaving the spirit behind. Another method depends on the affinity of lime for water in a vacuum. But the method most usually practised on a large scale is to add a salt, such as carbonate of potash, to the liquid, which has a great affinity for the water, and little or none for spirit.

Alcohol, in its absolute or anhydrous state (free from water), is a limpid, colourless liquid, of an agreeable smell, and a hot pungent taste. Its specific gravity is 0·791 at 68° F., or 0·7947 at 59° F. It has never been frozen, although exposed to a temperature 91° below zero, or 123° below the freezing point of water. It is extremely volatile, producing considerable cold during evaporation; the degree of cold is proportional to its purity. Heat expands alcohol in a greater degree than it does water, for 100,000 volumes become 104,168 by being heated from 32° to 100°; whereas an equal bulk of water heated to the same degree is increased only to 100,908. Under

the average atmospheric pressure alcohol boils at about 173°, but in the vacuum of the air-pump, ebullition occurs at 60° and even below it. Alcohol, and the vapour arising from it, are extremely inflammable; it burns with a lambent flame, the colour of which depends upon the strength of the alcohol; the blue tint prevails when it is strong, and the yellow when weak. Although the flame of alcohol yields but little light, its heat is intense; it burns without any smoke. There are several substances which communicate colour to the flame of alcohol: boracic acid and salts of copper impart green, barytic salts yellow, and the salts of strontia an intense and beautiful red colour. Alcohol may be fired by the electric spark, which when passed through a mixture of the vapour of alcohol and oxygen gas, causes it to take fire and explode violently. The vapour of alcohol requires three times its volume of oxygen gas to be perfectly burned, and it then yields water and twice its volume of carbonic acid gas. During the combination of alcohol and water, much heat is given off.

The following table, by Gay-Lussac, shows the quantity of absolute alcohol in mixtures of alcohol and water of different densities, at 59° Fahr.

Alcohol.	Water.	Specific Gravity.
100	0	0·7947
95	5	0·8168
90	10	0·8346
85	15	0·8502
80	20	0·8645
75	25	0·8799
70	30	0·8907
65	35	0·9027
60	40	0·9141
55	45	0·9243
50	50	0·9348
45	55	0·9440
40	60	0·9523
35	65	0·9595
30	70	0·9656

It is on these differences that depends the action of the instrument [HYDROMETER] employed by the Excise in estimating the duty on spirits.

Alcohol combines in definite proportions with chloride of calcium, nitrate of magnesia, and other salts, with which it forms *alcoates*. It dissolves resins, essential oils, camphor, sugar, soap, and numerous acids, with readiness; it also readily dissolves ammoniacal gas. As alcohol remains fluid at the lowest temperatures, it is advantageously employed in filling thermometer tubes, and in experiments on artificial cold; its antiseptic properties are great, and hence its use in preserving anatomical preparations; on account of its ready inflammability, the purity, and the intense heat of its flame, it is conveniently, but not economically, employed in chemical lamps, usually termed *spirit lamps*.

Saussure, by passing the vapour of alcohol through a red-hot porcelain tube, decomposed it; Dumas and Boully effected the decomposition over ignited oxide of copper; and the result obtained by both corresponded very closely with that resulting from the atomic theory of its constitution, and which gives 3 eq. H, 2 eq. C, 1 eq. O, or, in 100 parts.

Hydrogen	13·04
Carbon	52·17
Oxygen	34·79
	100·

It will further appear by calculation, that the vapour of alcohol is equivalent to a compound of one volume of aqueous vapour and one of olefiant gas, condensed into one volume.

ALCOHOL, *Medical Properties of.* These are of a two-fold kind: first, those in which it is employed on account of its solvent powers; and secondly, those in which its own powers over the human frame lead to its use as a therapeutic agent. The former is treated of under TINCTURES.

In the first place, it is proper that the mode of action of alcohol should be understood, to determine when it should be used. A single moderate dose, suitable for the individual, produces effects which are entirely limited to the viscera of the abdomen. They extend themselves from the solar plexus of nerves to the organs upon which the splanchnic nerve is distributed, and excite in these a livelier action. A feeling of comfort in the abdomen, quicker and more powerful digestion, stronger peristaltic motions, increased desire for meat and drink, more abundant secretion, especially augmented secretion from the kidneys, are the common phenomena which result from the lowest degree of its action. A larger quantity, or several small doses repeated at short intervals, extend the action beyond the sphere of the splachnic nerve, even to the spinal chord, the brain, and entire nervous system. The feeling of comfort and warmth experienced in the præcordial region is diffused over the whole frame. The pulse is raised, becomes more powerful and quicker, all muscular actions take place with more ease, strength, and capacity of endurance, the tone of the nervous system is raised, the influence of the nervous energy upon the other organs is quicker and more powerful; but, above all, that part of the nervous system whose functions are executed by the brain is most perceptibly increased, as is seen in the greater cheerfulness, humour, and courage, as well as the more active and acute power of thinking. During this degree of action the sensibility to external impressions is unimpaired, or in many instances even augmented, as is manifested by a more eager participation in the incidents occurring or sentiments expressed, and in the expansion of the affections or passions.

Contemporaneously with these, all the functions of organic life are carried on more actively; of which we have proof in the increased secretions, especially of the cutaneous transpiration and secretion of urine.

From this view it is obvious that alcohol is an agent which, within certain limits, may be most beneficially employed in many diseases of the system.

ALCORAN, or ALKORAN. [KORAN.]

ALCOVE. The term is originally from the Arabic language, in which it means simply the cave, hollow, or recess; and it passed into the other European languages through the Spanish. In most of the modern European languages it is

applied to a recess in a room, intended for a bed. In England, alcove is applied to a similar recess in a room of any kind, and yet more commonly to an ornamental covered garden seat.

ALCUIN, or, as he called himself in Latin, Flaccus Albinus Alcuinus, was one of the most learned men of the eighth century. He was probably born about A.D. 735, and perhaps in the city of York. He tells us himself, he received his education in the cloister school of York, where he had for his masters Egbert and Aelbert, who were successively archbishops of that see. He afterwards became himself master of the school, where he taught till A.D. 780. He was also appointed keeper of the library which Egbert had founded in the cathedral; of the contents of which he has given a curious account in one of his poems. He was likewise ordained a deacon of the cathedral, but would not accept any higher rank in the priesthood. Having been sent by Aelbert's successor, Eanbald, to Rome (A.D. 781) to procure for him the pallium, Alcuin on his return passed through Parma, where the Emperor Charlemagne then was. At the invitation of the emperor he came, after completing his mission, to his court, and he lived on terms of intimacy with Charlemagne for the rest of his life. Charlemagne bestowed upon him the abbeys of Ferrières, in the diocese of Sens, and of St. Lupus, at Troyes. Alcuin, who was one of the most learned men of his age, was a kind of teacher at the court of Charles, and he had among his pupils Eginhard, or Einhard, and the emperor himself. Much of Alcuin's time was also occupied in theological controversy, and other labours connected with his clerical calling. In 796 the emperor gave him the abbey of St. Martin, at Tours, to which Alcuin retired; and here he established a school and a library. This school of Tours became one of the chief places of learning in those times. In his old age Alcuin gave himself up almost exclusively to theological studies; but he produced also many works, some of which were intended for the use of learners. Alcuin died on the 19th of May, 804, and was buried in the church of St. Martin.

A great part of our information about Alcuin is derived from his own letters, of which 230 have been printed. His Latin poems also, which are by no means devoid of merit, contain valuable information. The poem on the bishops and holy men of York, which is now universally assigned to Alcuin, is a kind of history of the see.

The most complete edition of the works of Alcuin, is that of Froben, Ratisbon, 1777, 2 vols. folio. The 'Life of Alcuin,' by F. Lorenz, Halle, 1829, has been translated into English, by Jane Mary Slee, London, 1837, 8vo.

ALCYO'NEÆ (Savigny), a group of marine animals of low organization, belonging to the class *Phytozóa*, or *Polypifera* (sub-kingdom *Acrita*). They are distinct alike from the sponges or *Porifera*, and the cortical and tubular *Phytozoa*, or zoophytes. They possess neither a calcareous axis, nor a horny or calcareous sheath, but consist of a firm cartilaginous mass, with calcareous spiculæ dispersed through its substance. The surface of this substance, varying in form, is studded with hydra-like polypes, each in its own cell, the cells being excavated in the living gelatinous mass, to the nutriment of which, as the common bond of vital union between them, they all contribute. These polypes are furnished with tentacles capable of contraction and expansion. The alcyoneæ are found attached to marine plants, stones, rocks, &c. As examples, we may notice *Alcyonium lobatum*, not uncommon in the European seas; it presents a number of finger-shaped lobes; the polypes are white, but the general mass varies from light pink to deep orange: *Alcyonidium gelatinosum*, variable in form, phosphorescent, and inhabiting deep water: *Alcyonella stagnorum*, a fresh-water species found in France, attached to aquatic plants.

ALDBOROUGH. [BOROUGHBRIDGE.]

ALDE'BARAN, the Arabic name of a large and bright star of the first magnitude, called in modern catalogues *a* Tauri, situated in the eye of the constellation Taurus, whence it is called also by the Arabs *Ain al Thaur*, the bull's eye. It is the bright star in the group of five, known by the name of the *Hyades*. [TAURUS.]

ALDEGRE'VER, HEINRICH, a German painter and engraver of the sixteenth century, born at Soest in Westphalia, in 1502. He became the pupil of Albert Dürer, and imitated his style so closely that he acquired the name of Albert or Albrecht of Westphalia, a circumstance which has misled some writers to call him Albert Aldegrever. As a painter, Aldegrever executed little; he was chiefly occupied in engraving his own designs. His prints are very numerous, exceeding 300, and they bear dates between 1522 and 1562. His designs are conspicuous for the sharp and angular lines of the Gothic style; but though hard and wiry, many of his figures display good anatomical drawing. His paintings are in the same style of design as his engravings. (Heinecken, *Dictionnaire des Artistes dont nous avons des Estampes;* Bartsch, *Peintre-Graveur.*)

ALDEHYDE, or hydrated oxide of acetyl, is a limpid colourless liquid, having an æthereal and suffocating smell; its specific gravity is 0·790; it boils at 72° Fahrenheit, and mixes in all proportions with water, alcohol, and æther; it is neutral to test paper. Its component elements are 4 eq. C, 4 eq. H, 2 eq. O; and its atomic number 44. It is capable of assuming two other forms [ISOMERISM], *elaldehyde* and *metaldehyde;* it combines with ammonia, resin, phosphorus, sulphur, and iodine; it is decomposed by chlorine and bromine; and oxygen converts part of it into acetic acid.

ALDEHYDIC ACID is an acid liquor obtained from aldehyde, and easily decomposed. It appears to contain the elements of acetic acid minus an equivalent of oxygen.

ALDER. ALNUS.

ALDERMAN. This word is from the Anglo-Saxon *ealdorman* or *eoldorman*. The term *ealdorman* is composed of *ealdor*, originally the comparative degree of the adjective *eald*, 'old,' and *man;* but the word *ealdor* was also used by the Anglo-Saxons as a substantive, and as such it was nearly synonymous with the old English

term *elder*, which we so often meet with in the English version of the Bible. In a philological sense, the terms *ealdor* and *ealdorman* were synonymous and equivalent; but in their political acceptation they differ, the former being more general, and, when used to express a specific degree, commonly denoting one that is lower than ealdorman. In both terms the notion of some high office, as well as that of rank or dignity, seems to be inherent; but ealdorman at the same time expressed a definite degree of hereditary rank or nobility which ealdor does not so necessarily imply. Princes, earls, governors of provinces, and other persons of distinction, were generally termed ealdormen by the Anglo-Saxons.

In modern times, aldermen are individuals invested with certain powers in municipal corporations, either as civil magistrates themselves, or as associates to the chief civil magistrates of cities or corporate towns. In the municipal boroughs of England and Wales, as remodelled by 5 & 6 Wm. IV. c. 76, the resident burgesses elect councillors having a property qualification. The councillors thus elected by the burgesses hold office for three years, and one-third of their number go out annually. The aldermen are elected by the council from its own number for six years, and one-half go out every three years. One-fourth of the municipal council consists of aldermen, and three-fourths of councillors.

In the Corporation of London, which is not remodelled by the 5 & 6 Wm. IV. c. 76, the Court of Aldermen consists of twenty-six aldermen, including the lord mayor. Twenty-five of these are elected for life, by such freemen as are householders of the wards. The twenty-sixth alderman belongs to the dependency of Southwark. This alderman is not elected at all, but, when the aldermancy is vacant, the other aldermen have, in seniority, the option of taking it; and the alderman who does take it holds it for life, and thereby creates a vacancy as to the ward for which he formerly sat. The Court of Aldermen possess the privilege of rejecting, without any reason assigned, any person chosen for alderman by the electors, and, after three such rejections, of appointing an alderman to the vacancy. The lord mayor is appointed from such of the aldermen as have served the office of sheriff. The Court of Aldermen is the bench of magistrates for the city of London, and it possesses also authority of a judicial and legislative nature in the affairs of the corporation.

ALDERNEY, or AURIGNY, one of the islands in the English Channel, lying in the bay of Avranches, near the coast of Normandy. It is the nearest of this group of islands to the French coast, being about seven miles west of Cape La Hogue, from which it is separated by the strait or 'Race of Alderney,' a channel very dangerous in stormy weather, from its conflicting currents, but safe at other times, and affording sufficient depth of water for the largest ships. Alderney is distant from Guernsey (N.E. by N.) about 15 miles, or 20 from port to port; from Jersey about 33 miles from coast to coast, and 45 from port to port; and about 55 or 60 miles S. by E. from Portland Bill, the nearest point of England.

The island is about 3¾ miles long, from N.E. to S.W.; about 1¾ broad; and about 8 miles in circuit. The S.E. coast is formed by picturesque and lofty cliffs, from 100 to 200 feet high. As the approach to the island is often dangerous, three lighthouses are provided on a cluster of rocks called the Caskets, off the western coast. The climate is mild and healthy; the soil sandy, gritty, and gravelly round the coast, but in the valleys it is very fertile, producing excellent corn and potatoes. In the meadows they grow rye-grass and clover, which give excellent milk and butter. The grass lands occupy about one-third of the area of the island. The land is generally elevated, but consists both of high and low tracts; a good supply of excellent water is procured in every part of the island. The Alderney cows maintain their reputation: they are easily distinguished from those of the neighbouring islands by being remarkably small, and straight in the back.

The inhabitants, who in 1841 amounted to only 1030, are engaged in fishing and in a few handicraft employments. 'The town,' which is known simply by that designation, is situated in a beautiful valley nearly in the centre of the island, with roads leading to Braye and Longy Bays, and comprehends all the houses in Alderney. It is partly paved, but presents, as may be supposed, few buildings worthy of notice. The church is dedicated to St. Anne, and the parish is in the diocese of Winchester. The government-house is near the church. An ancient monastery at Longy Bay has been made to serve the purpose of a barrack in time of war, and a depôt for military stores and an hospital since the conclusion of the peace. The island contains the decayed foundations of a castle which bears the name of 'Essex Farm,' from having been for a time the residence of the Earl of Essex, the favourite of Queen Elizabeth.

The civil power is vested in six jurats, who are chosen by the people, and hold their offices for life, unless removed for misbehaviour. These, with twelve 'Douzainiers,' representatives of the people, form a sort of local legislature, the douzainiers having only the power of deliberating, not of voting. Other matters relating to the civil and judicial powers, and to the history of Alderney, are noticed under GUERNSEY, of which Alderney is a dependency.

The inhabitants are about equally divided between members of the Established Church and Wesleyan Methodists. All are more or less educated, and nearly all understand both English and French.

ALDROVAND, ULYSSES, the most celebrated naturalist of the sixteenth century, was born at Bologna, in 1527, where he died the 4th of May, 1605, at the age of 78. He was of a noble family. Nothing seems to have been recorded of his early studies, and but few incidents of his after-life. It is only known that he visited several parts of Europe in quest of knowledge in his favourite science. According to M. Aubert le

Mire, he gave a painter whom he employed in drawing specimens a yearly salary of 200 crowns for upwards of 30 years; and engaged as engravers Christopher Coriolanus, Lorenzo Bennini, and others. The expenses which he incurred in this way, as well as in the purchase of specimens, exhausted his fortune; and it is reported he was so much reduced in circumstances, that having become blind in his old age, he was compelled to go into the hospital of Bologna, where he died.

His works on natural history are comprised in 13 folio volumes, in Latin, of which he himself only published 4; namely, 3 upon birds, dated 1599, 1600, and 1603, reprinted at Frankfort, in 1610; and 1 upon insects, in 1602. In 1606, immediately after his death, his widow published a volume on Exsanguineous Animals, including Shell and Corals.

The merits of Aldrovand have been, in our judgment, greatly misrepresented by writers on natural history. 'We can only,' says the writer of his life in the 'Biographie Universelle,' 'consider the books of Aldrovand as an enormous compilation without taste and without genius, while the plan and manner of them are in a great measure borrowed from Gesner. Buffon says, with reason, that they would be reduced one-tenth if all the inutilities and things foreign to the subject were expunged.'

But so far from this copiousness of illustration being an objection, it is to us one of the greatest recommendations of the works of Aldrovand, without whose aid the works of Buffon himself would have frequently been meagre and imperfect.

Several specimens from his cabinet are still to be seen at the Institute of Bologna; but his numerous MSS. were removed to Paris by Napoleon, and we do not know whether they have been restored.

ALDUS. [MANUTIUS.]

ALE. An intoxicating beverage obtained from barley or other grain steeped in water and afterwards fermented, has been used from very early times. Pliny the Elder says ('Hist. Nat.,' xiv. 29, ed. Hardouin) that the western nations have intoxicating liquors made of grain steeped, and that the mode of making them is different in the provinces of Gaul and Spain, and their names differ, though the principle is the same: he adds that in Spain they had the art of making these liquors keep. He also mentions the use of beer by the Egyptians. In Gaul it was called 'cervisia,' a word which was introduced into the Latin language, and is also preserved in the French 'cervoise.' (Pliny, xx. 25; Richelet, 'Dictionnaire.')

Herodotus, who wrote 500 years before Pliny, tells us that the Egyptians used a liquor made of barley (ii. 77). Dion Cassius says that the Pannonians made a drink of barley and millet (lib. xlix. c. 36, and the note in Reimarus's edition). Tacitus states that the ancient Germans 'for their drink drew a liquor from barley, or other grain, and fermented it so as to make it resemble wine.' (Tacitus, 'De Mor. Germ.' c. 23.) Ale was also the favourite liquor of the Anglo-Saxons and Danes; it is constantly mentioned as used in their feasts; and before the introduction of Christianity among the northern nations, it was an article of belief that drinking copious draughts of ale formed one of the chief felicities of their heroes in the Hall of Odin.

In early periods of the history of England, ale and bread appear to have been considered as equally victuals or absolute necessaries of life. This appears from the various assizes or ordinances of bread and ale (*assisæ panis et cervisiæ*) which were passed from time to time for the purpose of regulating the price and quality of these articles. In the fifty-first year of the reign of Henry III. (1266) a statute was passed, the preamble of which alludes to earlier statutes on the same subject, by which a graduated scale was established for the price of ale throughout England. In process of time this uniform scale of price became inconvenient; and by the statute 23 Henry VIII. c. 4, it was enacted, that ale-brewers should charge for their ale such prices as might appear convenient and sufficient in the discretion of the justices of the peace or mayors within whose jurisdiction such ale-brewers should dwell.

ALE-CONNER. An ale-conner is an ale-kenner, one who kens or knows what good ale is. The office of ale-taster or ale-conner is one of great antiquity. Those who held it were called 'gustatores cervisiæ.' Ale-conners or ale-tasters were regularly chosen every year in the court-leet of each manor, and were sworn to examine and assay the beer and ale, and to take care that they were good and wholesome, and sold at proper prices according to the assize; and also to present all defaults of brewers to the next court-leet. Similar officers were also appointed in boroughs and towns corporate; and in many places, in compliance with charters or ancient custom, ale-tasters are, at the present day, annually chosen and sworn, though the duties of the office are fallen into disuse.

The duty of the ale-conners appointed by the corporation of the city of London is to ascertain that the beer sold in the city is wholesome, and that the measures in which it is given are fair. For this purpose they may enter into the houses of all victuallers and sellers of beer within the city. The investigation is made four times in the year; and on each occasion it occupies several days. The days are not publicly known beforehand. Southwark is not visited. The investigation into the wholesomeness of the article has fallen into disuse. Fairness in the measures is ensured by requiring all pots to be stamped with the city arms.

ALEHOUSES. In the eleventh year of Henry VII. (1496) an act was passed 'against vacabounds and beggers' (11 Hen. VII. c. 2), which contained a clause empowering two justices of the peace 'to rejecte and put awey comen ale-selling in townes and places where they shall think convenyent, and to take suertie of the keepers of ale-houses of their gode behavyng by the discrecion of the seid justices, and in the same to be avysed and aggreed at the tyme of

their sessions.' From that time to the present alehouses have been from time to time regulated by acts of Parliament.

In 1828 a general act to regulate the granting of alehouse licences was passed (9 Geo. IV. c. 61), which repealed all former statutes on this subject. The following are the most important provisions of this act:—1. Licences are to be granted annually, at a special session of magistrates, to be called the General Annual Licensing Meeting, to be holden in Middlesex and Surrey within the first ten days of March, and in every other place between the 20th of August and the 14th of September. Any person who is refused a licence may appeal to the quarter sessions; and no justice is to act in an appeal who was concerned in the refusal of the licence. 2. Every person who intends to apply for a licence must affix a notice of his intention, with the name, abode, and calling of the applicant, on the door of the house which he wishes to open as an alehouse, and on the door of the church or chapel of the place in which it is situated, on three several Sundays, and must serve a copy of it upon one of the overseers, and one of the peace-officers. 3. If a riot or tumult happens, or is expected to happen, two justices may direct any licensed alehouse-keeper to close his house; and if this order be disobeyed, the keeper of the alehouse is to be deemed not to have maintained good order therein. 4. The licence is subjected to a condition that the keeper of the house shall not adulterate his liquors; that he shall not use false measures; that he shall not permit drunkenness, gaming, or disorderly conduct in his house; that he shall not suffer persons of notoriously bad character to assemble therein; and that (except for the reception of travellers) he shall not open his house during divine service on Sundays and holidays. 5. Heavy and increasing penalties for repeated offences against the tenor of the licence are imposed; and magistrates at sessions are empowered to punish an alehouse-keeper, convicted by a jury of a third offence against the tenor of his licence, by a fine of 100*l.*, or to adjudge his licence to be forfeited.

Under the Metropolitan Police Act (2 & 3 Vict. c. 47), which, under certain conditions, may be extended to within fifteen miles of Charing Cross, all public-houses are to be shut on Sundays until one o'clock in the afternoon, except for refreshment of travellers; and publicans are prohibited from supplying distilled liquors to persons under sixteen years of age, under a penalty for the first, second, and third offences of 20*l.*, 40*l.*, and 50*l.*

Taking the average of the first five months in the years 1838-39, the total number of drunken persons apprehended on the Sunday by the police was 2301, and in the first five months after the new act came into operation the number was 1928. The decrease was most marked in the police divisions situated in the centre of the metropolis. ('Statement of the Commissioners of Police,' vol. iv. p. 268, of 'Journal of London Statistical Society.')

An act of Parliament (1 Will. IV. c. 64) is

entitled 'An Act to permit the general sale of Beer and Cider by retail in England.' The following are the most material provisions of this statute:—1. That any householder, desirous of selling malt liquor, by retail, in any house, may obtain an Excise licence for that purpose, to be granted by the Commissioners of Excise in London, and by collectors and supervisors of Excise in the country, upon payment of two guineas; and for cider only, on payment of one guinea. 2. That a list of such licences shall be kept at the Excise Office, which is at all times to be open to the inspection of the magistrates. 3. That the applicant for a licence must enter into a bond with a surety for the payment of any penalties imposed for offences against the act. 4. That any person licensed under the act, who shall deal in wine or spirits, shall be liable to a penalty of 20*l.* 5. That in cases of riot, persons so licensed shall close their houses upon the direction of a magistrate. 6. That such persons suffering drunkenness or disorderly conduct in their houses shall be subject to penalties, which are to be increased on a repetition of the offences, and the magistrates before whom they are convicted may disqualify them for selling beer for two years. 7. That such houses are not to be open before four in the morning, nor after ten in the evening, nor during divine service on Sundays and holidays.

This statute withdraws the authority of granting licences to houses for the sale of ale, beer, and cider only, from the local magistrates, in whose hands it had been vested for nearly 300 years, and supersedes their direct superintendence of such houses. It creates a new class of alehouse-keepers distinct from those who are licensed by the magistrates, and who only are called licensed victuallers. The consequence of the facility of obtaining licences upon a small pecuniary payment, and without the troublesome and expensive process directed by former statutes, was a rapid multiplication of alehouses throughout the country.

By 4 & 5 Wm. IV. c. 85, the preamble of which recited that much evil had arisen from the management of houses in which beer and cider are sold by retail under 1 Wm. IV. c. 64, it was enacted that each beer-seller is to obtain his annual Excise licence only on condition of placing in the hands of the Excise a certificate of good character signed by six rated inhabitants of his parish, none of whom must be brewers or maltsters. Such a certificate is not to be required in towns containing a population of 5000 and upwards; but the house to be licensed is to be one rated at 10*l.* a year. This act makes a difference between persons who sell a liquor to be drunk on the premises and those who sell it only to be drunk elsewhere.

By a Treasury order, beer sold at or under 1½*d.* a quart may be retailed without a licence: the officers of excise are empowered to enter such houses and to examine all beer therein.

By the 3 & 4 Vict. c. 61, which amends both of the above acts, a licence can only be granted to the real occupier of the house in which the beer

or cider is to be retailed; and the rated value of such house is raised to 15*l.* in towns with a population of 10,000 and upwards; in towns of betwixt 10,000 and 2500, to 11*l.*; and in towns of smaller size the annual value is to be not less than 8*l.* Every person who applies for a licence must produce a certificate from the overseer of his being the real occupier of the house, and of the amount at which it is rated. A refusal to grant this certificate renders the overseer liable to a penalty of 20*l.*; and any person forging a certificate, or making use of a certificate knowing it to be false, is to forfeit 50*l.*

The hours for opening and closing beer-shops are now regulated by the above act. In London and Westminster, and within the boundaries of the metropolitan boroughs, they are not to be opened earlier than five in the morning, and the hour of closing is twelve o'clock; but eleven o'clock in any place within the bills of mortality, or any city, town, or place not containing above 2500 inhabitants; and in all smaller places, five o'clock is the hour for opening and ten o'clock for closing. On any Sunday, Good Friday, or Christmas-day, or any day appointed for a public fast or thanksgiving, the houses are not to be opened before one o'clock in the afternoon. Licensed victuallers, and keepers of beer-shops who sell ale to be drunk on the premises, are liable to have soldiers billeted upon them.

The number of licensed victuallers in England and Wales has increased from 50,947 in 1831 to 57,698 in 1843. The only year which shows a decrease on the preceding year was 1842, the number in 1841 having been 57,768. In 1840 there were 7610 houses occupied by licensed victuallers, the rental of which was under 8*l.*; 10,769 houses under 10*l.*; 20,185 under 20*l.*; and 5335 at and above 50*l.*

The number of beer-shops of both classes was 44,134 in 1836, and they have gradually declined to 36,298 in 1842, and 36,301 in 1845. In 1836 there were 39,104 retailers of beer to be consumed on the premises; in 1842 only 31,821; and in 1845 the number was 32,624. In 1839, after a gradual increase in the preceding three years, the number of retailers who sold beer for consumption elsewhere than on the premises was 5941, and the number has since regularly decreased to 4477 in 1842, and 3687 in 1845.

The retailers in cider and perry under the acts for the sale of beer were 1913 in number in 1835, and only 954 in 1845.

Number of licensed victuallers and beer retailers in England and Wales who brewed their own beer, in 1843:—Licensed victuallers, 26,806; retailers of beer to be consumed on the premises, 12,761; retailers of beer not to be consumed on the premises, 1245. Malt consumed by the above:—By licensed victuallers, 7,567,945 bushels; by retailers for consumption on the premises, 2,761,672; by retailers for consumption elsewhere, 397,188 bushels. In the Country Excise collections one half the licensed victuallers brew; and in London there are only 10 who brew out of 4344.

The victuallers and keepers of beer-shops who do not brew are supplied by brewers, of whom there were 2318 in England and Wales in 1843, who used 15,962,323 bushels of malt; rather more than one-third of this quantity of malt (5,349,143 bushels) being consumed by 98 brewers in the London Excise collection. Since 1785 brewers of beer for sale have been compelled to take out an excise license, the cost of which is in proportion to the quantity brewed. In 1845, the number of brewers of strong beer not exceeding 20 barrels was 7733; above 20 and under 50 barrels, 8290; above 50 and under 100 barrels, 9269; above 100 and under 1000 barrels, 16,306; exceeding 1000 barrels, 1635.

In October, 1830, the duty of 9*s.* per barrel on strong beer, and 1*s.* 11½*d.* on table and small beer, was abolished. In the previous year the consumption of England and Wales was 6,559,210 barrels of strong and 1,530,419 barrels of small beer, which allows for upwards of 21 gallons per head on the year's consumption. The produce of the duty was 3,217,812*l.* With the same rates of duty the produce of this branch of revenue was only 79,414*l.* in Scotland: the beer duty in Ireland ceased in 1795.

In 1843 the declared value of 141,313 barrels of ale and beer exported was 343,740*l.*

ALEMAN, MATEO, a Spanish writer, who was born at Seville about the middle of the sixteenth century. He held an office in the financial department, under Philip II., which he filled with honour for a long period. Disgusted at last with the broils of the court, he requested his dismissal; and having obtained it, he retired to devote himself entirely to study. In 1604 he published a 'Life of St. Antonio de Padua,' in Latin verse, not without merit. He subsequently went to Mexico, and in 1609 published there an 'Ortografia Castellana.' But the work which entitles him to the notice of posterity is his 'Guzman de Alfarache,' which he published at Madrid in 1599. In this amusing and interesting work Aleman shows that he was both a philosopher and a man of the world. It is a bitter satire on the corrupted manners of Spain at that time. The work is one of the many novels called 'Picarescas,' which about that period appeared in Spain, and professed to describe the life and manners of rogues, vagabonds, and beggars, bringing also the other classes of society upon the stage, either as their victims, abettors, or protectors. Aleman's work is written in a pure and correct style, though, from the nature of the subject, it is very often vulgar and even indelicate. His book was soon translated into almost all the European languages. The work of Le Sage, which bears the title of 'Guzman de Alfarache,' resembles in no respect the novel of Aleman. The precise time of Aleman's death is not known, but it is supposed that it occurred under the reign of Philip III. (Nicolao Antonio, *Bibliotheca Hispana Nova.*)

ALEMANNI, or ALLEMANNI. This name, Alemanni, *Allemanni*, *Alamanni*, or *Allamanni*, (the Greek writers call them Ἀλαμβανοι) has been the subject of much fruitless speculation; but it is more reasonable to look for the origin of the word *Alemanni* in some Teutonic dialect than

anywhere else; for it cannot be doubted that this people were Germans.

Ancient authors agree in this, that the Alemanni were a mixed race, and this word a generic name for many tribes. Agathias (i. c. 6) has the following remarkable passage:—'If we are to follow Asinius Quadratus, an Italian, who has written an accurate account of the *Germans*, the Allemanni were a *gathered mob* and *mixed race*, and this *is expressed by their very name*.' Thus we may conclude that the Roman word *Allemanni* was formed from the Alemannic *Allemannen*, since in German, *alle* still signifies *all*, and *mann* (*plur.* männer), *a man*, and that *Allemannen* meant in their language *all men*, or *all sorts of men*,—a union of many tribes. The French, as they have borrowed from the Normans the name of *Normand*, which was significant in the language of the Normans though not in French, so they have also borrowed from the Alemänni the appellation *Allemand*, which they have extended to the whole German nation.

The principal abode of the Alemanni was the heart of Germany, between the sources of the Rhine and the Danube; from this centre their sway seems to have extended along the banks of both these rivers, towards N.E. and N.W. In the earliest period of their history, their limits are supposed to have been the Rhine, the Danube, and the Main; in subsequent ages their territory extended towards the Alps and the Jura mountains. The first notice respecting them in history occurs A.D. 214, in the reign of Caracalla. This emperor was some time among them, and lived with them on good terms; they greatly admired his hardiness, frugality, military habits, and personal bravery. But under the pretext of raising a regiment of auxiliaries, he called a meeting of those who were of military age, and having surrounded them by his soldiers, he gave a signal for a general massacre. This treachery kindled an inextinguishable hatred to the Romans in the breast of the Alemanni; and for many centuries they continued the most unrelenting enemies of the empire.

After Caracalla's reign, the Alemanni made frequent incursions into Gaul. Alexander Severus, who reigned from A.D. 222 to A.D. 235, led an army against them, but being murdered by his own soldiers, he left the victory to his successor Maximinus, who devastated their country from the Rhine to the Danube. During the disturbances in the Roman empire in 238 and the following years, caused by the despotism and bad conduct of Maximinus, the Alemanni recommenced their invasions in Gaul with impunity. In A.D. 257-60, Valerian's general, Postumus, again drove them out of that country and erected fortresses in their territory. After the death of Probus, A.D. 282, the Alemanni could no longer be resisted. Constantinus Chlorus, A.D. 298-301, ventured to cross the Rhine, and even marched as far as to the Danube; still the Romans gained no permanent possession of the countries to the east of the Rhine. In a bloody battle at Langres, Constantine the Great slew vast numbers of them, and after this disaster they remained quiet. But during the reign of the sons of Constantine they again invaded Gaul, and settled on both banks of the Rhine, from the Main to Strassburg. Julian drove them out of Gaul, and made several expeditions into their German domains. In A.D. 357 he beat seven of their chieftains in a bloody battle at Strassburg. The third time, A.D. 359, he seems to have attacked them almost without a cause. After some opposition Julian crossed the Rhine; and eight Alemannic chiefs concluded a peace with him at Mainz. During the latter part of his reign they did not venture to attack the Romans; but Valentinian I. had almost incessantly to contend with them. Gratian, A.D. 377, fought a bloody battle with them at Argusturia (now Horburg). In the latter part of the fourth and the beginning of the fifth centuries, they occupied the southern and western banks of the Rhine, opposite the mouths of the Neckar and Main. In the middle of the fifth century they spread over Helvetia, as far as the Jura and the Lake of Geneva. After the bloody victory gained by the Frankish king Clodwig, at Tolbiacum (now Zülpich), in 496, they lost their eastern and western Frankish possessions. Many of them sought refuge with Theodoric the Great, who assigned to them abodes in Rhætia. In A.D. 536, Vitiges ceded them to the Franks; and after this they were united to the Suevi, and with them consolidated into a dukedom, called the Duchy of Alemannia. After this period, their history is absorbed in the general history of Germany; yet from that circumstance, and from the extension which the French have given to their name, we may judge that they were a preponderating tribe among the Germanic nations.

The Alemanni were a warlike people, and the Romans particularly admired their cavalry. The country was divided into *gauen*, by the Romans called *pagi*; which had their name either from the tribes who inhabited them, or from the chiefs or dukes, called kings by the Romans, who ruled over them. Each of these had its peculiar constitution, and was independent; in war only they all acted as one people, with united interests, and had one general. The Alemanni had a body of laws given to them by the kings Theodoric, Childebert, and Clothar, and improved by Dagobert.

ALEMBERT, JEAN LE ROND D'. On the 16th or 17th of November, 1717, a new-born infant was found exposed in a public market by the church of St. Jean le Rond, near the cathedral of Notre Dame, at Paris. This infant was the celebrated D'Alembert. How he obtained his surname is not mentioned; probably it was that of his foster-mother. He was found by a commissary of police, and was intrusted to the wife of a poor glazier. In a few days the father made himself known, and settled an allowance of about fifty pounds sterling for his support. This father was M. Destouches, commissary of artillery; the mother was Mademoiselle de Tencin, a lady celebrated for her talents and profligate adventures. D'Alembert has left an account of himself written in the third person; Condorcet and others have

contributed additional materials for his life. He commenced his studies at the Collége des Quatre Nations, at the age of twelve years. The professors were not long in discovering the talents of their pupil. They endeavoured to dissuade him both from mathematics and poetry, although they permitted him to study the rudiments of mathematics; and from that time he persisted in the pursuit. When he left college, he returned to his foster-mother, with whom he lived altogether forty years, and continued his studies. She gave him little encouragement, for when he told her of any work he had written, or discovery which he had made, she generally replied, 'You will never be anything but a philosopher—and what is that but an ass who plagues himself all his life, that he may be talked about after he is dead.' His friends urged him to enter a profession, to which he at last agreed, and chose the law. After being admitted an advocate, he abandoned this profession and took to physic, as more congenial to his own pursuits. Determined to persevere, he sent all his mathematical books to a friend. One book after another was begged back, to refresh his memory upon something which he found he could not keep out of his head. At last, finding his taste too strong for any prudential consideration, he gave up the contest, and resolved to devote himself entirely to that which he liked best.

Some memoirs which he wrote in the years 1739 and 1740, as well as some corrections which he made in the 'Analyse démontrée' of Reynau, procured him admission to the Academy of Sciences, in 1741, at the age of twenty-four. In 1743 appeared his 'Treatise of Dynamics,' founded upon the general principle which bears his name. The deductions from this new and fertile source of analytical discovery appeared in rapid succession. The various methods and hints which are so richly scattered in his physico-mathematical works have always been considered as rendering them a mine of instruction for mathematicians. The French 'Encyclopédie,' as is well known, was commenced by Diderot and himself, as editors. On the stoppage of the work by the government, after the completion of the second volume, he retired from the editorship, nor would he resume his functions when permission to proceed was at length obtained. From that time he confined himself entirely to the mathematical part of the work. In 1772 he was elected perpetual secretary of the Academy, and wrote the 'Eloges' of the members who had died from 1700 up to that date. The whole of his literary and philosophical works have been collected in one edition by M. Bastien, in eighteen volumes, octavo, Paris, 1805. His mathematical works consist of various treatises; eight volumes of 'Opuscules;' and the articles of the 'Encyclopédie.'

In 1752 Frederic of Prussia endeavoured to attract him to Berlin. D'Alembert refused the offer, but in 1754 he accepted a pension of 1200 francs. In 1756 he obtained the same sum from Louis XV. In 1762 Catherine of Russia requested him to undertake the education of her son, with an income of 100,000 francs, which offer he declined. His death took place October 29th, 1783. The last seven years of his life had been passed in bitter sorrow for the death of Mademoiselle de l'Espinasse, who had at one time been much attached to him. She had subsequently treated him with contempt and unkindness, but which were insufficient to destroy his regard for her. Friendship, it is affirmed, was their only bond of union.

The character of D'Alembert was one of great simplicity, carried even to bluntness of speech, and of unusual benevolence, mixed with a keen sense of the ridiculous. He held that a man should be *very* careful in his writings, careful *enough* in his actions, and *moderately* careful in his words. Another maxim was that no man ought to spend money in superfluities while others were in want. His attentions to his foster-mother, to the end of her life, were those of a son.

D'Alembert has been held up to reprobation on account of his religious opinions. His real opinions are known through his private correspondence with Voltaire, published after his death. But the public writings of D'Alembert contain no expressions offensive to religion; and they are free from that odious intolerance of all opinions except their own which prevails in the writings of some of his colleagues in the 'Encyclopédie,' such as Diderot and Voltaire.

ALEMBIC, a chemical apparatus used in distillation, consisting of a *body*, *cucurbit*, or *matrass*, to contain the fluid to be distilled, a *head*, or *capital*, fixed above it to receive and condense the vapour which rises on the application of heat to the cucurbit, and a pipe descending from the head to a *receiver*, or vessel prepared to receive the condensed product of distillation, which, in its passage from the head to the receiver, is frequently passed through a *worm* or serpentine pipe immersed in cold water as a refrigeratory. Alembics or stills are made of both glass and metal, the several parts being fitted together with ground or luted joints, and of various forms according to the purpose for which they are employed.

ALENCON. [ORNE.]

ALENTE'JO, or ALEMTEJO, the largest province of the kingdom of Portugal, so called from its position (*alem Tejo*, beyond the Tagus). It is bounded N. by the Tagus and the Sever, E. by Spanish Estremadura and Andalucia, S. by the Sierras of Caldeirão and Monchique, which separate it from Algarve, and W. by the ocean and Portuguese Estremadura. The eastern and western boundaries are very irregular. The province covers a surface of 10,500 square miles; its population is not known, but is supposed not to exceed 40 to the square mile. The most fertile parts are around Evora, Portalegre, Elvas, Villavieiosa, Beja, and the plains of Ourique. The highest ridge of mountains is the already-mentioned Sierra de Monchique on the south, which rises at one point to the height of 4078 feet. From the northern side of this mountain the waters are collected into the river Sado, which reaches the sea at Setubal. In the spring the malaria arising from this river is very injurious to the health of the inhabitants. Besides the rivers already mentioned the Guadiana runs along part

of the eastern boundary. The Sierra de Portalegre rises to 2130 feet; that of Osa, north of Evora, slightly exceeds this height. Nearly the whole country is covered with mountains. The harbours of Sines and Villa Nova de Milfontes are of little value. The population is not very industrious, yet corn is produced to such an amount as to contribute largely to the support of Lisbon; but the supply of wine and oil is less abundant. The wine is altogether consumed within the province, and a considerable quantity of oil is often imported from the bordering regions of Spain. There are many quarries of marble, white, green, and red. The political divisions of the province are these: it contains the eight *comarcas* or districts of Evora, Elvas, Portalegre, Ourique, Villaviciosa, Beja, Crato, and Aviz. Evora, the chief city of the whole province, is the seat of an archbishop; and three bishops take their titles from Elvas, Portalegre, and Beja. Elvas is a place of great military strength, and with the adjoining fortress, La Lippe, protects the frontier on the side of Badajoz.

ALEPPO. [HALEB.]

ALESSANDRIA, one of the five divisions of the principality of Piedmont, which is again subdivided into the provinces of Alessandria, Asti, Casale, Acqui, Voghera, and Tortona. The whole division is said to contain a population of above 510,000.

The province of Alessandria is intersected by hills of small elevation, the spurs or offsets of the Apennine chain which divides Piedmont from the Riviera of Genoa. It is bounded on the north by the Po, which receives below Alessandria the Tanaro. The Tanaro receives the Belbo a little above Alessandria, and the Bormida (increased by the Orba) a little below it. The chief products of this province are, maize, wine, silk, madder, and the best flax in Piedmont. It contains very little wood. The population is estimated at above 90,000.

ALESSANDRIA, a town and fortress in Piedmont, the capital of the province of Alessandria, is situated near the conflux of the Tanaro and Bormida, in 44° 54′ N. lat., 8° 38′ E. long. It was built by the Lombard league in 1168, as a barrier against Frederic Barbarossa and the Guibelines of Asti. Its citadel is one of the strongest places in North Italy, and has been repeatedly besieged, and taken and retaken, by the French and Austrians. The town is well built, has a fine square planted with trees, a cathedral, a new church dedicated to La Madonna di Loreto, several other churches, a public library, and some good palaces. The population is above 30,000, who carry on a considerable trade. There are some manufactures of linen, silks, cotton stockings, cotton handkerchiefs, and woollen cloth. Alessandria is 70 miles E. by S. of Turin, and 60 N. by W. of Genoa.

ALETHOPTERIS (Sternberg), a genus of fossil Ferns, mostly from the coal formation. (Pecopteris of Brongniart.)

ALEUTIAN ISLANDS, called also Aleutan, Aleutic, or Aleutsky Islands: these several names being derived from the Russian word *aleut*, which signifies a *bold rock*. This group of islands is situated in the North Pacific Ocean, between Cape Alaska in North America, and the peninsula of Kamtchatka in Asia; describing a circular arc which extends from 163° of W. to 166° of E. long., and thus comprehends 31° of long.

The first attempt at geographical discovery in this region, was planned, a short time before his death, by Peter the Great, of Russia, with the view of ascertaining the distance between the Asiatic and American continents; and partly by the exertions of a Dane, named Behring, and partly by those of the Kamtchadales, the islands were gradually discovered. A Russian survey of the islands was made in 1768, and Captain Cook added to the knowledge respecting them in 1778. In 1785 a commercial establishment was formed there, for the prosecution of the fur trade; and in 1799 this company received great aid and protection from the Russian government, which has ever since continued. The traders who first visited these islands are charged with having acted with the most wanton cruelty towards the natives, whose revengeful feelings were at length so far excited, that they seized upon every opportunity for retaliating upon their oppressors, and succeeded on several occasions in destroying the Russian vessels and murdering their crews. Captain Cook, when he visited the islands, found the inhabitants disposed to carry on a peaceable traffic with his sailors; and, at the present day, the Aleutians are observed to be generally a kind-hearted and inoffensive race, but when provoked to anger, they prove themselves malignant, implacable, and indifferent to personal danger.

The number of islands which compose the entire chain is very considerable. Above forty have received names. Those nearest to America receive the general name of the Fox Islands, of which Oonalashka is one of the principal; while those further westward are the Andrenovian group. All have a desolate appearance when viewed from the sea, and all are formed of rugged mountain tracts destitute of trees. The whole group bears evident marks of volcanic origin, and it is only on a few spots that edible vegetables can be grown.

The fur animals which the islands yield are bears, beavers, ermines, otters, foxes, and seals. Almost the only occupations of the inhabitants are fishing and hunting, and the preparation of implements necessary for the prosecution of those pursuits. In fishing they make use of a species of canoe, which they call a *baidar*, and which consists of a skeleton of wood, over which a covering of seal skins is extended. Thus constructed, these canoes are so extremely light that they may be carried about by one person without difficulty.

Domestic occupations, such as making clothes, and even the covering of canoes, are performed by the women, who likewise make mats, baskets, and other useful articles of straw.

The native inhabitants are mostly short, but stout made and well proportioned. But little difference is observable in the clothing of men and women, which consists of a frock made of seal

skin, fastened round the neck and descending below the knees. The same material is employed for making boots. Both the men and women bore their under lips, and by way of ornament insert pieces of bone in the holes. In their personal character, the Aleutians are very superstitious, and their domestic arrangements are based on the system of polygamy.

The food of the islanders consists almost entirely of fish, whale-blubber, and the flesh of sea animals. They provide in summer a store of fish, which they dry and lay up in small huts for winter use. Their habitations are holes dug in the earth and covered with sticks, over which grass and earth are thrown; the entrance is from the roof, whence also light is admitted through a window covered with dried fish skins, and the dwelling is divided into separate apartments by means of seal skins and straw mats, so that each one forms the abode of several families.

(Cook's and Kotzebue's *Voyages;* Coxe's *Russian Discoveries.*)

ALEXANDER. [PARIS.]

ALEXANDER I., son of Amyntas I., said to be the tenth king of Macedonia, succeeded his father probably about B.C. 506. Alexander's reign belongs to the eventful period of the Persian invasions of Greece, B.C. 490 and 480.

ALEXANDER II., the sixteenth king of Macedonia, was the son of Amyntas II., and ascended the throne about B.C. 369. He reigned only one year and a few months. (Thirlwall, *History of Greece,* iv. p. 162.)

ALEXANDER III., commonly called *Alexander the Great,* son of Philip II. king of Macedonia, was born B.C. 356. His mother was Olympias, the daughter of Neoptolemus, king of Epirus, through whom Alexander claimed a descent from the great Phthiotic hero, Achilles. (Pausan. i. 11.)

The early education of Alexander was entrusted to Aristotle; and to his early acquaintance with this great man we may ascribe much of the enlarged and vigorous understanding which in the midst of his excesses characterized the manly and capacious mind of his pupil. The military education of Alexander commenced from his boyhood: he was trained to be expert in all manly exercises, and particularly in the management of a horse. His first essay in arms was made at the battle of Chæroneia (B.C. 338), when his father crushed the united forces of Thebes and Athens with their allies, and established the Macedonian supremacy in Greece.

Philip was murdered (B.C. 336) during the celebration of his daughter's marriage, when he was just on the eve of setting out on his Asiatic expedition, at the head of the combined force of Greece. His sudden death inspired the states which had been humbled with some hope of throwing off the yoke of the Macedonian kings. Alexander, then in his twentieth year, though threatened with danger from the movements of the barbarians on the north, and the restless Greeks in the south, saved himself by his courage and abilities. The Thessalians readily chose him as the head of their confederacy; and the Amphictyons confirmed him in the honours which had been granted to Philip. His next step was to march an army into Bœotia, to check the beginning of insurrectionary movements, by showing himself at the gates of Thebes; and the states of Greece, Lacedæmon excepted, conferred upon him at Corinth the office of commander-in-chief against Persia.

Before Alexander set out on his Persian expedition, he resolved to reduce the barbarians of the north to obedience. He marched (in the spring of B.C. 335) in ten days to the passes of Mount Hæmus (the Balkan), crossed them in spite of the opposition of the natives, and descending into the great plain of the Danube, he defeated the Triballi. He also crossed the Danube and struck terror into the Getæ, who lived on the northern bank. A false report of his death, during his northern expedition, encouraged the Thebans to rise against the Macedonian garrison in the city. But Alexander soon appeared before Thebes, and after a short resistance entered the city. A dreadful massacre ensued. The Phocians, with the Plateans and other Bœotians in the army of Alexander, inflamed by the remembrance of what they had once suffered from this city, slew all before them, 'even those who made no resistance; they murdered the supplianta in the temples; they spared neither woman nor child.' (Arrian, i. 8.) Most of those who were not massacred were sold as slaves; the temples and the house of Pindar, it is said, were spared; but all the rest of the city, except the citadel, called the Cadmeia, was levelled to the ground.

In the spring of B.C. 334, Alexander set out on his Asiatic expedition with about 35,000 men. The chief part of his army was Macedonian, with about 7000 allied Greeks, some mercenary troops and several bodies of Thracians, 1500 Agrianian light-infantry, and some other bodies of troops. His cavalry, on which his success in a great measure depended, was mainly composed of Macedonians and Thessalians. He reached Sestos in twenty days, and crossed the Hellespont (Dardanelles).

At the time when Alexander entered Asia, the Persian empire was in a feeble and disorganized state. One monarch, with absolute power, had the sovereignty of many nations. The provinces that lay remote from the seat of government, could only be maintained by the presence of an armed force under a military governor nominated by the king. The partition of the empire and the distribution of power were essential to the very existence of the Persian monarchy; but this system was also the cause of its weakness and dissolution. Each powerful governor was kept in submission by no other motive than fear of punishment; and when he felt himself able to defy his master, the bond of union was broken. Darius, the last king of Persia, the contemporary with Alexander, was deficient in courage and military skill, and had no hope of opposing the invader except by turning against him the arms of the Greeks themselves. Darius relied on Memnon, a Greek of Rhodes, whose military skill might have made him, with better opportunities, a formidable opponent to the Macedonian king. The first combat between the invaders and the Persians was on the banks of the Granicus (now

perhaps the Oustvola), a river which falls into the Sea of Marmora. The personal courage of Alexander, who himself killed two Persians of the highest rank, and the long spears of the Macedonians, mainly contributed to secure him a complete victory over the Persians. The Greek infantry in the Persian army was cut to pieces, with the exception of 2000, who were sent into Macedonia in chains, and condemned to slavery. After the battle, Alexander won the affection of his soldiers by his kind behaviour to the wounded, and to the parents and children of those who fell in the battle. Twenty-five horsemen belonging to the Companion cavalry, a kind of military order, perhaps instituted by Alexander, had fallen in the first assault: Lysippus was ordered to make their figures in bronze, which were placed in the town of Dium in Macedonia, and afterwards adorned one of the public buildings of Rome. This victory led to the submission of most of the Greek towns on the Ægean.

To crowd into the compass of a short article the military operations of Alexander's campaigns would be a useless attempt. One of the most memorable events between the battles of the Granicus and Issus, which took place B.C. 333, was the capture of Halicarnassus in Caria, which Memnon only left when it was no longer possible to hold out. This memorable siege is minutely described by Arrian.

After gaining the strong post of Celænæ, near the source of the Mæander, Alexander marched to Gordium in Phrygia (B.C. 333), where he had a good opportunity of turning to profit the belief of a superstitious age. The empire of Asia was promised to him who should untie the complicated knot which fastened to the pole of a chariot the yoke and collars of the horses. Alexander relieved himself from the difficulty, either by cutting the cord, or some equally expeditious process.

The army was now increased by fresh reinforcements from home, and the return of the new married soldiers who had been sent to winter in Macedonia. The course of Alexander was from the high plains of Asia Minor over the mountains to Tarsus (Tersoos) in Cilicia. Here his career was nearly terminated by a fever, either caused by fatigue, or by throwing himself when heated into the cool stream of the river Cydnus. A similar act of imprudence at Tersoos is said to have been fatal to the Emperor Frederick Barbarossa.

From Tarsus Alexander marched along the Gulf of Issus to the little town of Myriandrus in Syria. Darius had occupied an extensive plain in Syria, well adapted for the evolutions of his large body of cavalry, and for the disposition of his immense army. Contrary to the advice of Amyntas, a Greek deserter, he abandoned this position for one in which defeat was almost certain. An offset from the range of Taurus runs down to the Gulf of Issus (the modern Gulf of Skanderoon), and terminates in a high cape. The mountains press close on the shores of the Gulf of Issus, leaving in some places a plain barely large enough for the battle-ground of an army. In one spot the pass is so narrow as to be capable of easy defence. By this unguarded pass Alexander had advanced into Syria, while by another pass farther north in the mountain range, Darius moved from Syria to the plain of Issus, with the river Pinarus in his front. He was now in the rear of Alexander, who marched back through the Syrian pass, and found the Persian king prepared for battle in the plain of Issus. Alexander crossed the stream, attacked the Persians with impetuosity, and a total rout followed. The Persian king himself gave the signal for flight, and escaped over the Euphrates by the ford at Thápsacus; but his mother, wife, and his infant son, who had attended him to the field of battle, fell into the hands of the conqueror, and experienced from him the most humane treatment. This victory (about the close of B.C. 333), decided the fate of the Persian monarchy.

Alexander advanced southward, and the cities of Phœnicia submitted; but Tyre, proud of her naval superiority, prepared for resistance. This great commercial city was situated on an island (33° 18′ N. lat., 35° 13′ E. long.) about half a mile from the mainland. Alexander, in order to assault the place, was compelled to unite the mainland and the city by a causeway, which was not effected without great difficulty. This work still remains, and the island of Tyre is now part of the mainland. After a laborious blockade of seven months, the place was taken by storm; 8000 Tyrians were slaughtered, and 30,000 more were sold into slavery. This wealthy city had long been the great entrepôt between the eastern and the western world; and through it the inhabitants of Europe had long received those Asiatic products which we find mentioned in the oldest Greek writers. Her commerce and her ships had penetrated to all known seas; and her adventurous traders, through many intermediate hands, received the products of countries which the Tyrians themselves never visited. Her merchants were princes, and her warehouses were stored with all that contributes to national wealth and domestic comfort. We find in the twenty-seventh chapter of Ezekiel a glowing picture of the prosperity of this great emporium, expressed with all the sublimity and strength of the ancient Hebrew poetry. (Volney's explanation of this chapter.—'Syria,' chap. xxix.) Gaza, one of the strong towns of Palestine, was also taken, and the women and children were sold as slaves.

After the sieges of Tyre and Gaza, according to Josephus, Alexander marched to Jerusalem, intending to punish the inhabitants for their refusal to supply him with troops and money. The high-priest Jaddus went forth to meet him, attended by the priests and people, and accompanied by all the imposing insignia of the Jewish religion. Alexander was so struck with this spectacle, that he pardoned the people, adored the name of the Most High, and sacrificed in the temple, according to the directions prescribed to him by Jaddus. The Book of the Prophet Daniel was shown to him, and the passage pointed out in which it was foretold that the King of Grecia should overcome the King of Persia. With this, as

the historian says, he was well satisfied, interpreting himself to be the person foretold by the prophet. Arrian says nothing about the visit to Jerusalem, and it is probably an invention. (St. Croix, 'Examen Critique,' p. 547, &c.)

In seven days the army marched from Gaza through the desert to Pelusium, the frontier town of Egypt on the east, which yielded without a contest, and the dominion of the country on the banks of the Nile passed from the Persians, who had held it since B.C. 525, to the Macedonians. From Pelusium Alexander visited the sacred city of Heliópolis, renowned for its temples and obelisks, and Memphis, then the great capital of Egypt. He next sailed down the Canopic or western branch of the Nile, and entered the Lake of Marea, where he founded the city of Alexandria. [ALEXANDRIA.] From motives of policy, vanity, or curiosity, Alexander determined to visit the far-famed temple of Ammon, an object of religious veneration to the Egyptians, and also probably, as it now is, the centre of a considerable trade. The site of this spot is now ascertained to be Siwah (29° 12′ N. lat., 26° 17′ E. long.), where the ruins of a temple and the hot springs confirm other evidence as to its locality. [SIWAH.] Alexander marched along the coast by the same route that Mr. Brown followed in 1792. Arrian's description of Alexander's interview with the priests of Ammon, and his notice of the oracular responses, is limited to a general remark.

In the spring of B.C. 331 Alexander marched to Tyre, and thence to the ford of Thapsacus on the Euphrates, and across Mesopotamia to the Tigris, a distance of above 800 miles. He found Darius encamped eastward of the Tigris, on the banks of the Bumádus, near a small place called Gaugaméla, or the 'Camel's House.' In the battle which ensued the Persians were completely defeated. Darius fled to Ecbátana (Hamadan) in Media. This battle is generally called the battle of Arbéla (now Erbil), up to which city Alexander pursued Darius. Arbéla is between forty and fifty miles east of Gaugaméla.

The ancient city of Babylon yielded at the approach of Alexander, who conciliated the people by sacrificing to Bel, according to the rites prescribed by the Chaldæans.

A march of twenty days brought the Macedonians from Babylon to the Choaspes (the Kerah), on the east side of which stood the city of Susa (Sus), then the chief residence of the Persian kings. From Susa Alexander advanced to the Pasitigris (the Karoon), and thence by the route which Timour afterwards followed, along the valley of Ram Hormuz, to the mountain pass (Kala-i-Sifid, the 'white castle'), which led into Persia Proper (Fars), the original seat of the Persians. His object was to surprise Persépolis, in which he succeeded. Persépolis was a sacred city to the Persians; the former capital of their early empire, and the burying-place of their kings.

From Persépolis Alexander marched to Ecbatana (B.C. 330). Darius fled past the ancient Rhagæ, and through the passes of the Elburz mountains (Caspiæ Pylæ), to seek a refuge in his Bactrian provinces. He was now a prisoner in the hands of the Bactrian satrap, Bessus, who accompanied him in his flight, and assumed the command. The march of Alexander from Rhagæ (the modern Rey, whose extensive ruins lie near Tehran), to his entrance into India, is the most obscure part of his history, for the geography of those regions is still imperfectly known. As he was coming up with the fugitives, Bessus took to more hasty flight, while two of his Persian attendants assassinated their unfortunate king, and made their escape. Alexander sent the body to Persépolis to be interred in the tombs of the Persian kings.

The army now advanced into the ancient Hyrcania, comprising a part of the modern Mazanderan, a country hemmed in on one side by lofty wooded mountains, and on the other stretching down in a sloping plain to the great inland waters of the Caspian. In Zadracarta, the capital of Parthia (a city whose site is unknown), Alexander stayed fifteen days. He then directed his march towards the frontier of Areia, along the northern verge of the great salt desert, and to Susia, (Toos?) a city of Areia. The traitor Bessus had fled into Bactria (Bokhara), one of the remotest possessions of the Persian monarchy, where he had rallied round him a few Persians, and a considerable body of the natives of the province. He had assumed the royal name of Artaxerxes, and placed the tiára erect on his head, the symbol of Persian sovereignty. Alexander set out towards Bactria, but was recalled by a revolt in his rear, which he speedily quelled. His course, which seems to have been changed by this unexpected revolt, was now bent to the country of the Drangæ, or Sarangæ, which was probably on the banks of the great river Helmund, which flows into the Lake of Zerrah.

Here one of those events in Alexander's life occurred which cast the darkest shade on his character. Philótas, the son of Alexander's faithful general Parmenion, was accused of conspiring against the king. He was put to death; and a letter was dispatched into Media, where the father then was, which ordered his execution also.

The army now advanced, probably along the valley of the Helmund, to the Ariaspi, who were kindly treated. The Arachóti, sometimes called the White Indians, a people who live west of the Indus, and south of the great mountains, were subdued by Alexander, 'in the midst of much snow, want of provisions, and hard suffering on the part of the soldiers.' His course now lay over the Caucasus, as his historian terms the western part of the Hindoo Coosh (Cau-Casus—Ko-Koosh), the mountain range that here separates the waters that flow southwards or into the ocean from those that contribute to the lakes of Central Asia. Bessus laid waste the country on the north side of the mountains, in order to impede the progress of his pursuer; 'but,' to use the simple and energetic words of the Greek historian, 'Alexander moved forwards not a bit the less: with difficulty, indeed, through deep snow, and without provisions; but still he moved on.'

On the nearer approach of Alexander (B.C. 329), the Persian satrap crossed the Oxus, burnt his boats, and retreated to Naútaca, a town of Sogdiana, the modern Mawarennahr. The Oxus is described by Arrian as the largest river crossed by Alexander except the rivers of India [Oxus]; its breadth was above half a mile, which proves that Alexander crossed it about the melting of the snow on the mountains in May or June. In five days Alexander passed all his army over by means of floats made of the tent skins of the soldiers stuffed with dried reeds and grass. ('Arrian,' iii. 29.) The traitor Bessus fell into the hands of Alexander soon after he had crossed the river; his nose and ears were cut off, and he was sent to Ecbatana to be put to death. Arrian honestly condemns this barbarous punishment.

From the Oxus the army marched to Maracanda (Samarcand), the royal city of Sogdiana, and thence to the Jaxartes (the Sir). After taking Cyrópolis on the Jaxartes Alexander crossed the river, defeated the cavalry of the Scythians, and pursued them under the burning heat of a Bucharian summer. A city founded on the Jaxartes, which bore the name of Alexandria, was designed to commemorate the limit of his conquests, and to serve as a frontier against the nomadic tribes. Alexander recrossed the Oxus, and spent the next winter (of 329 and 328 B.C.) at Bactra or Zariaspa. It was here, during a festival in honour of Castor and Pollux, and the drunken revellings which followed, that Alexander in a fit of passion murdered his friend Cleitus.

In the spring of 328 Alexander recrossed the Oxus; he paid a second visit to Samarcand, and spent the next winter in quarters at Nautaca. In the following spring (B.C. 327) he assaulted and took a strong natural fortress in which Oxyartes the Bactrian had deposited his wife and daughters. Alexander not only got possession of the strongest post in Sogdiana, but he found there a wife in Roxána, the daughter of Oxyartes, whom his followers pronounced to be the handsomest woman they had seen in Asia, after the wife of Darius. The memory of Alexander is still preserved among the ignorant inhabitants of Bucharia, where a *molla* reads in the public place to a numerous audience the exploits of Iskander the Great.

The progress of the army from Alexandria, to which Alexander had moved from Bucharia, to the passage of the Indus is difficult to trace, and his route has never yet been satisfactorily determined. Ptolemæus and Hephæstion were sent forward to prepare a passage over the Indus, by a bridge of boats. Alexander, who had probably spent the winter between the river of Caubul and the Indus, must have crossed the Indus early in B.C. 326.

The region which the Macedonian conqueror now entered is watered by numerous large streams, whence it receives the Persian name of Penj-âb, or the 'five rivers.' The waters of the Penj-âb unite in one stream, and fall into the Indus on the left bank, in 28° 55′ N. lat. Taxila was the first Indian town he came to, and here the army enjoyed some repose after its toils. Taxilas, the king, had saved himself by previous

submission. Alexander's progress was towards the Hydaspes (now the Behut, or Bedusta, also called by the natives the Jylum), a large river swollen by the solstitial rains. But a more formidable enemy than the swollen Hydaspes presented itself on the opposite bank. Porus, an Indian king, one of the great rulers of the Penj-âb, was stationed there with a formidable army, and a train of elephants. But Alexander with part of his troops and his formidable Companion cavalry crossed the river in another place before he was discovered. Porus made a gallant defence, but he was totally defeated. Alexander treated him with the respect due to his rank and courage, and restored to him his kingdom with extended limits. In this battle a number of elephants fell into the hands of the Greeks; and from this time we may date the use of that animal in European warfare.

From the Hydaspes the army advanced to the great Acésines or Chin-âb, which Ptolemy describes as above a mile in breadth. This estimate, which may be true of some parts in the rainy season, when Alexander crossed it, far exceeds the ordinary limits of the river. It was crossed in boats, and on skins. The country between the Chin-âb and the Hydraótes (Ravee, or Iraoty), to which Alexander was now advancing, is said to be a sheet of hard clay without a blade of grass, except on the banks of the rivers. He crossed the Hydraótes, and another Porus, who was king of the country between the Acésines and Hydraótes, fled as he approached. But all the Indians east of the Hydraótes were not cowards: the Cathæi, a warlike tribe, opposed the invader. Three days' march brought the Greeks to Sángala, where the Cathæi were stationed on an eminence, with a triple line of waggons around it. The city was captured with great slaughter, and the power of the brave Cathæi was for the time broken. A pastoral tribe, a robust and manly race, bearing the name of Kattia, or Jun, still exists in the countries between the Chin-âb and the Ravee, and is conjectured by a late explorer of those regions (Burnes) to be the Cathæi of Arrian. The king was still eager to press forward beyond the Hýphasis, a river which under the name of Garra joins the Chin-âb (29° 22′ N. lat.), and is formed of the united streams of the Sutledge and the Beeah. The latter name is a contraction of Bypasa, which retains some traces of the Greek name Hýphasis. But his Greek troops exhausted with fatigue, and disappointed in finding a country poor and full of vigorous enemies, could not be induced either by threats or persuasions to cross this river. The Hýphasis was, therefore, the boundary of Alexander's conquests, and of that victorious progress to which no other history offers a parallel.

The army retraced its steps to the Hydaspes, where a fleet was constructed of the timber which this river still abundantly supplies from the upper parts of its course. On descending the river to its confluence with the Acésines the fleet experienced, at the junction of these streams, the dangerous rapids which are said only to exist in July and August.

The Malli, a powerful Indian tribe, who seem

to have chiefly occupied the lower course of the Hydraótes (Ravee), were next attacked. Moultan, or Malli-than, which stands on a mass of ruins on the left bank of the Chin-âb, is probably the site of one of the conquered cities. In this campaign, Alexander, like some of the modern heroes of the Penj-âb, swam across the Ravee, at the head of his cavalry, to attack the enemy on the opposite bank. The Oxýdracæ, who were also obliged to surrender, may possibly have their name preserved in the name of Ouch, a considerable town on the left bank of the Chin-âb, five miles below the junction of the Garra, in 29° 16′ N. lat.

The troops moved downwards (B.C. 325) to the confluence of the Indus and the Chin-âb, at Mittun (28° 55′ N. lat.), where Alexander gave orders to found a city at the confluence of the two streams, and to build dockyards. With his fleet increased, Alexander sailed down the Indus, placing Crátcrus and the elephants on the east bank, with orders to advance. He visited, in his voyage downwards, the royal city of the Sogdi, and established there a dockyard. The next acquisition was Sindomana, the capital of Sambus, probably the modern Schwan (26° 22′ N. lat.), where there is a large mound 60 feet in height, surrounded by a wall of burnt brick, which now encloses only a heap of ruins.

A part of the army was now sent from the banks of the Indus by land, towards the country of the Arachoti and Drangæ (through Candahar), by a route now well known to exist; from Candahar they were ordered to proceed to Carmania. Shikarpoor on the Indus must be about the point of departure.

At Páttala (Tatta?), the apex of the great delta of the Indus, and about 65 miles from the sea, Alexander established a naval station, and founded a city. He also explored the two great arms that embrace the delta of the Indus. 'With a few horsemen,' says Arrian, 'he followed the outline of the Delta along the margin of the ocean, to see what kind of a country it was, and he ordered wells to be dug for the benefit of those who might navigate this coast.' He also established a naval station somewhere near the coast, and left a garrison.

Nearchus, the commander of Alexander's fleet, received orders to set out on his voyage along the coast towards the Persian Gulf, as soon as the change of the monsoons would allow him. The narrative of this voyage is given under NEARCHUS. Alexander himself set out from Pattala with his army somewhat earlier, about September, B.C. 325. The route from the Delta of the Indus to Bunder Abbas (Gombroon) on the shore of the Persian Gulf, is practicable for elephants, and also for an army when attended by a fleet with supplies. This line differs very little from that which Alexander would follow in his 60 days' march from the western limits of the Oritæ to Pura (Pureg?). During the march the army suffered greatly for want of supplies. From Pura the army advanced without any difficulty to the capital of Carmania (the modern Kirman). Here Alexander was joined by Craterus with the elephants. Nearchus also joined the king here, having conducted the fleet in safety to Harmozia, a place on the main land opposite the barren island of Hormuz (Ármuz), a name once celebrated in modern oriental warfare and commerce.

From Kirman Hephæstion led the mass of the army, with the beasts of burden and the elephants, down to the coast, as the road along the Persian Gulf was more practicable in the winter season that was approaching. The king himself advanced with his lightest troops and the Companion cavalry to Pasárgadæ (probably Murghaub), the burial place of the great Cyrus. [CYRUS; PASARGADÆ.] From Pasargadæ Alexander came to Persépolis, which he had taken before. Here he named Peucestas, a Macedonian, satrap or governor of the province of Persis, in the place of the Persian governor, who was hanged for his mal-administration. Peucestas forthwith adopted the dress and usages of the country, and made himself a perfect master of the Persian language. The Persians were of course pleased with their new governor.

At Susa, on the banks of the Ulai, or Choaspes (B.C. 324), the army rested from their toils. Alexander here took another wife, Barsine, the eldest daughter of Darius; and, according to Aristobúlus, he also married Parysatis, another Persian woman. Eighty of his chief officers also received each an Asiatic wife from their royal master. Every other Macedonian, who chose to take an Asiatic wife, was registered, and received a present on his marriage; the number who followed the king's example was above 10,000. In the midst of this scene of perhaps riotous festivity, we must not overlook the wise policy of Alexander, by which he endeavoured to blend the conquerors and the conquered into one nation by the strong ties of inter-marriage.

Discovery and works of utility still engaged his attention. He sailed down the Karoon (Arrian, vii. 7, calls it the Eulæus, by which he means the Shapur, which flows into the Karoon), into the gulf, examined part of the delta of these rivers, and ascending the Shat-el-Arab, went up the Tigris as far as Opis. In this voyage he removed several of those large masses of masonry, commonly called *bunds*, which were built across the river for the purpose of making a head of water and favouring irrigation.

About the close of B.C. 324 Alexander visited Ecbatana, the northern capital of the empire, where Hephæstion his favourite died. On his route towards Babylon from Ecbatana (Hamadan), Alexander diverted his grief by subduing the Cossæi, a mountain tribe of robbers. On his approach to the ancient city of Babylon, he was met by embassies from nearly every part of the known world, who had come to pay their respects to the new lord of Asia—from Carthage, from southern Italy, from Europe north of the Black Sea: Celts and Iberians, too, it is said, paid their homage in this motley assemblage.

The priests of the temple of Belus endeavoured to persuade the king that he could not safely enter the city: the great Belus himself had given this warning. The king despised the warning of Belus and his priests, and entered the city, which he proposed to make the seat of his empire.

While engaged in projects of voyages of discovery and the improvement of the agriculture and irrigation of Babylonia, and in preparing for an Arabian expedition, Alexander died. The immediate cause of his death was a fever, probably contracted while superintending the works in the marshes round Babylon. The daily bulletins during his illness are preserved by Arrian (vii. 25): he seems to have had no physician. He died at the age of thirty-two years and eight months, after a reign of twelve years and eight months. Arrian (vii. 28) has pronounced his perhaps too partial panegyric, the truth of which, however, no one should dispute till he has carefully weighed the whole evidence.

Alexander is said to have been a handsome man. He died without leaving any successor, or any distinct declaration of his will. His wife Roxana was with child at the time of his death.

His body was embalmed, and finally deposited at Alexandria, in Egypt, where it was seen by Cæsar Octavianus, afterwards the Emperor Augustus, B.C. 30. (Suetonius, 'Octavianus Cæsar,' c. 18.)

The chief authority for the campaigns of Alexander is Arrian's 'Anabasis,' of which there is an English translation by Rooke. This is the only extant authority that is trustworthy, and it is founded on the histories of Ptolemæus, afterwards King of Egypt, and of Aristobulus, both of whom accompanied Alexander in all his campaigns. The 'History of Quintus Curtius,' and the 'Life of Alexander,' by Plutarch, though both of them contain some facts not mentioned by Arrian, must be read with due caution, and should be compared with the Greek historian.

ALEXANDER I., surnamed BALAS, or BALLES, was king of Syria from B.C. 150 to 145. His predecessor, Demetrius I., occasioned by his bad government a rebellion, and this Alexander, who was a man of low birth, took advantage of the occasion to pretend that he was a son of Antiochus Epiphanes, and had a claim to the throne of Syria. He went to Rome, where the senate acknowledged his claim, and the pretender returned to Syria and commenced a war against Demetrius. Alexander obtained the support of Jonathan the Maccabee, and after losing one battle (B.C. 152), he gained a decisive victory over Demetrius (B.C. 150), who lost his life. Alexander Balas mounted the throne of Syria, and married at Ptolemáis, Cleopatra, a daughter of Ptolemæus Philométor, king of Egypt. Balas left the cares of administration to his favourite Ammonius, in order to enjoy a luxurious life. Ammonius put to death those members of the royal family of Syria whom he could get into his power, but there still lived in the island of Cnidus two sons of the last king, the elder of whom, Demetrius II., landed in Cilicia, and Balas marched against him. Ptolemæus, who had apparently come to assist his son-in-law, suddenly embraced the cause of Demetrius, after accusing Balas of an intention to murder him. Balas, being defeated by Ptolemæus, escaped into Arabia, where he was murdered by an Arabian chieftain. Demetrius II., surnamed Nikétor, or the Conqueror, then ascended the throne of Syria. (Josephus, *Antiquities of the Jews*, xxxiii. 2; 1 Maccabees x.)

ALEXANDER II., Zebínas or Zebinæus, a pretender to the Syrian crown, reigned over a part of the kingdom of Syria, from B.C. 128 to 122. The inhabitants of Apamea, Antiocheia, and some other cities, disgusted with the tyranny of Demetrius II., requested Ptolemæus Physcon, king of Egypt, to appoint another king. Ptolemæus sent them a young Egyptian, whom he represented as having been adopted by Antiochus Sidétes. Demetrius being defeated near Damascus, fled to Tyre, where he was murdered. Zebinas, thinking his kingdom firmly established, refused the annual tribute to Ptolemæus Physcon, who now encouraged Antiochus VIII., the son of Demetrius II. Zebinas was in his turn defeated by the Egyptian army, and retreated to Antioch; but being expelled from the city, and deserted by his troops, he endeavoured to escape in a vessel to Greece, but was taken by a pirate, and delivered into the hands of Ptolemæus, who put him to death. (Josephus, *Antiquities of the Jews*, xiii. c. 9, 10.)

ALEXANDER JANNÆUS, third son of Johannes Hyrcánus, succeeded his brother Aristobúlus as king of the Jews and as high-priest, from B.C. 106 or 104 to 79. He attacked Ptolemáis (the present Acre), which, like other cities, had made itself independent. Alexander also took Gaza, burned the city, and massacred many of the inhabitants. Jannæus embraced the party of the Sadducees; and, of course, was hated by the Pharisees and by the people. Having lost his army in an expedition against the Arabians, the Pharisees made an insurrection, and carried on a war for six years against the king, in which 50,000 Jews are said to have perished.

Having intimidated his enemies, and restored public peace, he engaged in several successful wars, by which he enlarged his dominions. He died at the siege of Regaba, or Ragaba, in the territory of Gerasene beyond the Jordan, in the twenty-seventh year of his reign. He had two sons; but left the government to his widow.

(Josephus, *Antiquities of the Jews*, xiii. c. 12—15.)

ALEXANDER, a son of King Aristobúlus II., and grandson of Jannæus, was taken captive in Judæa by Cn. Pompeius, who intended to exhibit him with his father and brother in his triumph at Rome. Alexander escaped, and raised a large army to attack Hyrcánus, who had been appointed by Pompeius to govern Judea. Marcus Antonius, who was sent against Alexander by Gabinius, governor of Syria, defeated him near Jerusalem, B.C. 57, and besieged him in Alexandrion, where he capitulated. Alexander once more took up arms, conquered Judæa, put many Romans to death, and besieged the rest in Garizin. But his army was finally defeated by Gabinius, in a great battle near Mount Tabor. Alexander at last fell into the hands of Metellus Scipio, and was beheaded at Antioch, B.C. 49. (Josephus, *Antiquities of the Jews*, xiv. c. 5, 6, 7.)

ALEXANDER POLYHISTOR. [POLYHISTOR, ALEXANDER.]

ALEXANDER SEVE'RUS. [SEVERUS.]

ALEXANDER I., one of the earliest bishops of Rome, succeeded Evaristus about the beginning of the second century of our æra, but the precise epoch is not well ascertained.

ALEXANDER II. [POPE.]

ALEXANDER III., Cardinal Rolando of Siena, succeeded Adrian IV. in 1159. His long pontificate of 21 years was agitated by wars against the Emperor Frederic I., and by a schism in the church, during which three successive anti-popes were raised in opposition to Alexander. [FREDERIC I. (*Barbarossa*).] He died at Rome in 1181. Thomas à Becket was archbishop of Canterbury during Alexander's pontificate. Alexander took part with the English prelate in his contest with King Henry II., and canonized him after he had been murdered. [POPE.]

ALEXANDER IV., V. [POPE.]

ALEXANDER VI., Roderic Borgia of Valencia in Spain, a man of great personal wealth and of some ability, but of loose conduct, was elected pope in 1492, after the death of Innocent VIII. At the time of his election he had four children by his mistress Vanozia, and after he became pope he made no scruple at employing every means in his power to confer on them honour and riches. The most notorious of his sons was Cæsar, first cardinal, and afterwards made Duke of Valentinois in Dauphiny by King Louis XII., from which he was styled the Duke Valentine, a name which he rendered infamous by his atrocities. The politics of the pope were capricious and faithless in the extreme. He alternately sided with the French and with the King of Naples. His internal policy was, if possible, still more perfidious. He was bent upon the destruction of the great Roman families of Colonna, Orsini, and Savelli; and either by treachery or open violence he in great measure succeeded in putting to death most of them, and seizing on their extensive possessions. He sent his son, the Duke Valentine, into the Romagna, where, by means of similar practices, the duke made himself master of that country, entrapping and strangling the independent lords and petty despots of the various towns. Alexander gave his only daughter, Lucretia Borgia, in marriage, first to Giovanni Sforza, lord of Pesaro, whom she afterwards divorced; then to a prince of the house of Aragon, who was murdered by her brother Cæsar; after which she lived some time in the pontifical palace, sharing in the intrigues and licentiousness of that court. She was married a third time, in 1501, to Alfonso d'Este, son of Hercules, duke of Ferrara, to whom she brought as a dowry 100,000 golden pistoles, besides jewels. Alexander's eldest son, John, duke of Gandia, was murdered one night while returning from a debauch, by unknown assassins, and thrown into the Tiber. (Roscoe's 'Leo X.,' vol. i.) At last Alexander himself died on the 18th of August, 1503, being 74 years of age. It was said, and several historians have repeated the assertion, that he died of poison which was intended for his guest, the Cardinal of Corneto. The pontificate of Alexander VI. is certainly the blackest page in the history of modern Rome. [POPE.]

ALEXANDER VII., VIII. [POPE.]

ALEXANDER I., king of Scotland, was a younger son of Malcolm III. (Canmore), and succeeded his eldest brother Edgar, who died without issue on the 8th of January, 1107. In those times, in Scotland, as well as in other countries, the succession to the throne was frequently regulated, at least to a certain extent, by the will of the reigning king; and Edgar, at his death, left part of his dominions to his younger brother David. Alexander was at first inclined to resist this apportionment; but he eventually acquiesced in it. His reign, almost from its commencement, was agitated by successive insurrections; every one of which, however, he promptly put down. One of the most serious was that excited in the district of Moray, in 1120, by Angus, the grandson of Lulach, son of the wife of Macbeth, and the occupant of the throne for a few months after the death of that usurper. Angus claimed the crown in virtue of this descent; but the attempt was met by Alexander with his usual decision, and speedily quelled. Alexander showed equal spirit in resisting all foreign encroachments upon the independence of his kingdom. He died at Stirling, without leaving any legitimate issue, on the 27th of April, 1124, and was succeeded by his brother David I.

ALEXANDER II., king of Scotland, was born at Haddington, on the 24th of August (St. Bartholomew's day), 1198, and succeeded his father, William the Lion, on the 4th of December, 1214, being crowned at Scone on the following day. He began his reign by entering into a league with the English barons who were confederated against King John,—engaging to aid them in their insurrection, on condition of being put in possession of the northern counties of England. This led to several devastating incursions into each other's dominions by the two kings. The death of John, in October, 1216, put an end to their hostilities; and the following year Alexander concluded a treaty of peace with the new sovereign of England, Henry III., one of the conditions being that Alexander should espouse Henry's eldest sister, the Princess Joan. This marriage accordingly took place on the 25th of June, 1221. In the course of the following thirteen or fourteen years, Scotland was disturbed by insurrections which broke out successively in Argyle, in Caithness, in Murray, and in Galloway; all of which, however, Alexander succeeded in repressing. The death of Queen Joan, however, without issue, on the 4th of March, 1238, and the marriage of Alexander, on the 15th of May in the following year, with Mary, daughter of a French nobleman, Ingelram de Couci, broke this bond of amity; and after some years of mutual dissatisfaction and complaint, the two kings prepared to decide their differences by arms in 1244. By the intervention, however, of some of the English nobility, bloodshed was prevented, after Alexander had approached the border with an army, it is said, of 100,000 men; and a peace was concluded at Newcastle in August of that year. In 1247, another insurrection broke out in Galloway, which Alexander soon succeeded in putting down. In

the summer of 1249, he had set out at the head of an army to repress a rebellion raised by Angus, lord of Argyle, when he was taken ill at a small island, variously spelled Erray, Kerreray, Kerarry, or Kirarry, off the coast of Argyle, and died there on the 8th of July. By his second marriage, he left an only son, his successor.

ALEXANDER III., king of Scotland, the son and successor of Alexander II., was born at Roxburgh on the 4th of September, 1241. Although only eight years old at his father's death, he was crowned at Scone. He had already, when only a year old, been betrothed to Margaret, the eldest daughter of the English king, Henry III.; and notwithstanding the youth of both parties, the celebration of the marriage took place at York, on the 25th of December, 1251. The connection thus formed, together with the minority of his son-in-law, gave Henry a plausible pretext for interfering, as he was very anxious to do, in the affairs of Scotland; and the distracted state of that kingdom, occasioned by the factions among the nobility, facilitated his views. It was the commencement of the design so perseveringly pursued by Henry and his successor, to reduce the Scottish kings to the condition of vassals. The eminent talents, however, which Alexander began to display as soon as he came of age and took the administration of affairs into his own hands, effectually thwarted the further prosecution of these views so long as he lived. Meanwhile he kept on good terms with his father-in-law. In 1260 he visited London with his queen; and in February, 1261, the latter was delivered at Windsor of a daughter, who was named Margaret.

Alexander had not long assumed the government, when he was called upon to meet a foreign power, which aimed at the conquest of the kingdom. On the 1st of October, 1264, Haco, king of Norway, approached the coast of Ayrshire at the head of a numerous fleet, but a storm and a battle completed the destruction of the invading force; and Haco with difficulty made his escape, only to die of a broken heart a few months afterwards. Next year Magnus, Haco's successor, agreed to relinquish to the King of Scotland the Hebrides and the Isle of Man for the sum of 4000 marks, and a small yearly quit-rent. In 1282, the peace between the two kingdoms was further consolidated by the marriage of Alexander's daughter, Margaret, to the Norwegian king, Eric, then a youth of fourteen. Margaret died in 1283, but left a daughter of the same name, commonly designated the Maiden of Norway, who eventually became the successor of her grandfather on the Scottish throne.

The successful resistance which, seconded by his clergy, he offered to an attempt of the pope to levy certain new imposts in his dominions, is almost the only other act of Alexander's reign which history has commemorated. Under his sway, Scotland appears to have enjoyed a tranquillity to which she had long been a stranger, and which she did not regain for many years after his decease. The death of his daughter Margaret, however, was the first of a succession of calamities. His son died without issue, and a second marriage of Alexander's was equally unfruitful. On the 16th of March, 1286, as he was riding in a dark night between Burntisland and Kinghorn, on the banks of the Frith of Forth in Fifeshire, he was thrown with his horse over a precipice, and killed on the spot. The death of Alexander, followed as it was in a few years by that of the Maiden of Norway, was one of the most unfortunate events that ever befel Scotland. But Alexander was lamented by his subjects on account of his own wisdom and virtues. The country had never before enjoyed such prosperity, and Scotland may be said, during this reign, to have passed from semi-barbarism to civilization.

ALEXANDER, WILLIAM. [STIRLING, EARL OF.]

ALEXANDER JAROSLAWITZ NEVSKOJ enjoyed a high renown among his countrymen for bravery, prudence, and religious zeal: he has been celebrated in many a Russian ballad, and is still venerated by the present generation. He was the second son of the Grand Duke Jaroslaw II. Wseladowitz, and was born at Wladimir in 1219. His father had submitted to the Tartar rule, and received Wladimir as a fief from Batu-Khan, by whom he himself was confirmed in that grand duchy in 1245.

Alexander, while his father was still alive, had distinguished himself by two great victories, one over the Swedes, and another over the united order of the Livonian and Teutonic Knights of the Sword. Pope Gregory IX. instituted a crusade against him by the Esthonian and Livonian Knights of the Sword, to whom he joined the Teutonic order; but their forces were totally defeated on the 15th of July, 1240, at the confluence of the Ishora and the Neva. By this victory he obtained the honourable surname of Nevskoj, or Alexander of the Neva. While he was thus engaged, the Knights of the Sword, commanded by their chief, Hermann von Balk, had taken Pleskow. Early in the year 1241 Alexander marched against them from Novogorod, and drove them out of Pleskow; but next winter saw the enemy again in the field. The Knights of the Sword had advanced within twenty miles of the city of Novogorod. With great speed Alexander again collected his army, pursued the retreating enemy, and on the 5th of April, 1242, fought them on the ice of the Lake of Peipus, where he gained a decisive victory: 400 Teutonic Knights were slain, and fifty were taken prisoners; those of the prisoners who were Germans were pardoned, but the Esthonians Alexander ordered to be hanged, considering them as Russian rebels.

Arms proving unavailing, the Roman court had recourse to diplomacy as a surer means for converting Alexander. This attempt, however, likewise failed; but though Alexander was successful against the Pope, he continued a vassal of the Tartars as long as he lived; it does not, however, appear that Russia was during his reign actually invaded or plundered by them.

He repaired to the great horde three times, and died on his return from the last of these journeys at Kassimcow in 1263; from that place his body

was removed to Wladimir, and there interred. The foundation of St. Petersburg in 1703, on the very spot where the national hero had gained such an important victory, naturally recalled the memory of Alexander Nevskoj in a lively manner. The Tzar Peter on this occasion instituted St. Alexander Nevskoj's Order of Knighthood, but did not himself give that decoration to any one; this was first done after his death by his consort Catharine. There is also in St. Petersburg a St. Alexander-Nevskoj Monastery, which is well endowed, to which is now attached a seminary for the education of young divines, called St. Alexander-Nevskoj's Academy.

ALEXANDER, emperor of Russia, called Alexander Paulovich, was born on the 23rd December, 1777. He was the son of Paul, afterwards emperor, and of Maria, daughter of Prince Eugene of Würtemberg. His education was directed by his grandmother, the reigning empress, Catharine II., who lived until he had attained his nineteenth year. Alexander married, in 1793, the Princess Louisa Maria Augusta of Baden. Catharine was succeeded, in 1796, by her son Paul, whose mad reign was put an end to by his assassination on the 24th of March, 1801. Alexander was forthwith proclaimed emperor and autocrat of all the Russias.

The first indication of the policy of Alexander was the conclusion of peace with England, in 1801. After the declaration of war by England against France in 1803, symptoms began to appear of an approaching breach between Russia and France, and a treaty of alliance with England was concluded in 1805, to which Russia, Austria, and Sweden were parties. This coalition speedily led to actual hostilities. The campaign was eminently disastrous to the allied powers. A succession of battles, fought between the 6th and the 13th of October, almost annihilated the Austrian army. On the 2nd of December, the Austrian and Russian troops, commanded by the two emperors in person, were beaten in the battle of Austerlitz. The immediate consequences of this great defeat were, the conclusion of a convention between France and Austria, and Alexander's departure to Russia with the remains of his army. A coalition between Prussia and England was concluded in 1806. On the 8th of October hostilities recommenced, and the victory of Jena, gained by Bonaparte, laid the Prussian monarchy at his feet. The battles of Eylau and Friedland, in which the Russian armies were signally defeated, terminated the campaign. An armistice was arranged on the 21st of June; and five days after Alexander and Napoleon met in a tent erected on a raft in the middle of the Niemen. A treaty of peace was signed between the two, at Tilsit, on the 7th of July; by a secret article of which Alexander engaged to join France against England. He accordingly declared war against his late ally on the 26th of October following.

The friendly relations of Alexander with France continued for nearly five years. His policy, which afforded some gratification to his ambition, entailed a vast amount of privation on his people, by severing their commercial connection with England. It was found impossible to carry out the continental system of Bonaparte; and a rupture with France became inevitable. On the 19th of March, 1812, Alexander declared war against France; and on the 24th of April he left St. Petersburg to join his army on the western frontier of Lithuania. The immense army of France, led by Napoleon, entered the Russian territory on the 25th of June. As they advanced, the inhabitants fled as one man, and left the invaders to march through a silent desert.

On the 7th of September took place the first serious encounter between the two armies, the battle of Borodino, in which 25,000 men perished on each side. On the 14th the French entered Moscow. In a few hours the city was a smoking ruin. Napoleon's homeward march, and the destruction of his magnificent army, were the first decisive blows to the mighty fabric of the French empire.

In the early part of 1813 Prussia and Austria successively became parties to the alliance against France. Alexander continued to accompany the allied troops throughout the campaign of the summer. He was present at the battle of Dresden, and of Leipzig. On the 30th of March, 1814, 150,000 of the troops of the allies were before the walls of Paris; and on the following day at noon, Alexander and William Frederick entered that capital.

After the deposition of Napoleon, Alexander and the King of Prussia visited England. The congress at Vienna opened on the 3rd of November, 1814. In the political arrangements made by this assembly, Alexander obtained his share of advantages, having been recognized as King of Poland. Before the members of the congress separated, however, news arrived of Bonaparte's escape from Elba. They remained together till after the battle of Waterloo; when Alexander, with the Emperor of Austria and the King of Prussia, proceeded to Paris, where they arrived in the beginning of July, 1815, and where, on Sept. 26, they signed the very questionable treaty to which they gave the name of the Holy Alliance. After these great events, the remaining years of Alexander's life appear comparatively unimportant. His influence was felt in the direction of European affairs, and that influence was not favourable to liberty.

In the beginning of the winter of 1825 Alexander left St. Petersburg on a journey to the southern provinces. About the middle of November he was suddenly attacked by the common intermittent fever of the country, and when he arrived at Taganrog, on the sea of Azof, he was very ill, and on the morning of the 1st of December he expired. It was for some time rumoured in foreign countries that Alexander had been carried off by poison; but it is now well ascertained that there is no ground whatever for this suspicion.

The advancement of almost every branch of the national prosperity in the course of the quarter of a century during which Alexander filled the throne, was probably greater than at any other period since the reign of Peter the Great. Edu-

cation, literature, and the arts were liberally encouraged; the agriculture, manufactures, and commerce of Russia were all immensely extended during his reign.

Alexander had no issue. On his death his next brother, the Grand Duke Constantine, surrendered the throne to his younger brother, the present Emperor Nicholas.

ALEXANDERS. [SMYRNIUM.]

ALEXANDRETTA. [SCANDEROON.]

ALEXANDRI'A (Ancient), owed its origin to Alexander the Great, who, during his visit to Egypt (B.C. 332), gave orders to erect this city between the sea and the Mareotic Lake. The architect was Dinócrates, a Macedonian. A large part, but not the whole of it, was contained within the present walls, which are chiefly the work of the Arabs. One main long street, 30 stadia (above 3 miles) in length, ran through the city from the eastern extremity to the Necrópolis, or cemetery of Alexandria, at the western; and this was intersected by another main street, 10 stadia in length, running nearly north, in a direction from the Mareotic Lake. The object of this arrangement was to give the city the benefit of ventilation from the north winds. The main land and the island of Pharos were connected by a dyke, called the Heptastádium, in which, at each end, there was a passage for vessels from one port to the other. Over these passages there were also bridges. On the rocks now occupied by the present Pharos, a magnificent light-house was constructed by Sóstratus, of Cnidus, in the reign of Ptolemæus Philadelphus (B.C. 283): its height is stated, though probably with much exaggeration, to have been 400 feet. The port bounded by the two promontories, the Pharos and Lóchias, by the north-east part of the city, and the Heptastádium, was called the Great Port. The other port was called Eunostus ('safe return'). The city was divided into several quarters: the court end, otherwise called Bruchion, contained the Muséum.

A place called Soma (the body), in the quarter of the palaces, contained the tomb of Alexander the Great. Besides the canal which united port Eunostus with the lake, there was a canal from the lake to the town of Canópus, situated near the mouth of the western branch of the Nile. By means of this canal the city was supplied with river water, which was kept in cisterns.

The city was embellished by the Ptolemies with the spoils of the ancient towns of Egypt, and for several centuries continued to receive accessions and improvements. At one time it was the rival of Rome in size, and the first commercial city of the earth. Diodorus, who visited Alexandria about B.C. 60, says, that the registers showed a population of more than 300,000 free citizens.

The enclosure, which is surrounded by a double wall flanked with lofty towers, contains the remains of old Alexandria, an almost shapeless mass of rubbish. Of the two granite obelisks, commonly called Cleopatra's Needles, one is still standing; the other is lying near it on the ground. The dimensions of the two are pretty nearly the same. The whole height of the erect obelisk, including the pedestal and the three steps, all of which are covered with earth, is about 79 feet.

About the centre of the enclosure stands the mosque of St. Athanasius, on the site of a christian church erected by this patriarch during the fourth century. In this mosque the French discovered the beautiful sarcóphagus of Egyptian breccia, which is now in the British Museum. The ancient cisterns for keeping the Nile water are still in great part preserved. They consist of vaulted chambers supported by columns, which form arcades of two or three stories. The interior walls are covered with a thick red plaster that is not permeable to water.

The only remarkable monument between the wall and the lake, is the column commonly called the Pillar of Pompeius. It stands on a mound of earth about 40 feet high, which contains remains of former constructions. The shaft, which consists of a single piece of red granite, is about 67 feet long, and weighs at least 276 tons: the whole height, with the capital, which is in bad taste, and the base and pedestal, which are no better, is about 94 feet. According to a Greek inscription on the plinth of the base, it appears to have been erected (though perhaps not for the first time) in honour of the Emperor Diocletian, by a prefect of Egypt whose name cannot be further deciphered than that it begins with PO.

From B.C. 323 to B.C. 30, when Alexandria fell into the hands of the Romans, it was the residence of the Greek kings of Egypt, the resort of commerce, and of many foreign nations, especially Jews; and also the centre of the scientific knowledge of that day. In the campaigns of Julius Cæsar at Alexandria, B.C. 48, the place sustained much damage.

From B.C. 30 to the Arab conquest under Omar, A.D. 640, Alexandria was still a flourishing city under the Roman emperors, and afterwards under the eastern empire. Alexandria early adopted the Christian religion, and became one of the strongholds of the true faith. It was also the theatre on which the Christians showed the most determined hostility to all the works of Pagan art.

In 969 the Fatimite caliphs seized on Egypt, and built New Cairo, from which time Alexandria declined still more, and sunk to the rank of a secondary Egyptian city; the discovery of the route round the Cape of Good Hope, in 1497, tended still further to diminish the commerce of Alexandria; but it is again becoming an important position, in consequence of lying on the way of the overland route to the British possessions in India.

ALEXA'NDRIA, called *Iskanderieh* by the Arabs, the only seaport of Egypt, stands on an artificial neck of land which joins the continent to the ancient island of Pharos; 31° 13′ N. lat., 29° 53′ E. long.

The district around Alexandria consists of a long narrow strip of land, bounded on one side by the Mediterranean, and on the other by the Lake Mareotis. The whole of this district, which extends from the Tower of the Arabs to Cape Aboukir, is a continuous chain of calcareous rock

and sand, without good water, and almost without vegetation.

There are two ports. The old port, on the west side of the town, is at the extremity of an extensive roadstead, the entrance to which lies across a chain of rocks stretching from Cape Marabout on the main land to the Cape of Fig Trees, which is the western extremity of the island of Pharos. There are three passages into the road, the deepest of which will admit frigates, and probably vessels of the line. The port itself, which is at the eastern extremity of the roadstead, is sheltered from the violent winds that blow between N.W. and N.E. by the high coast of the island of Pharos, and it has good anchorage. The new port, which is on the east side of the town, has also a line of rocks stretching across the entrance, and it is more exposed and shallower than the old port. The fort of Pharos, which is also a light-house, is connected with the island of Pharos by an artificial dyke, made in part of ancient granite columns laid transversely.

The modern town occupies the neck of land between the two ports. The materials of ancient Alexandria have been extensively employed in its construction. The streets are narrow and unpaved; dusty in summer and muddy in winter. The town is supplied with water by means of cisterns, which are filled by the winter rains and from the Mahmoudieh Canal. The town contains a great number of mosques, and some public buildings, such as the custom-house, new palace, marine arsenal and dock-yard, and the fortifications. The population in 1801 was estimated at 7000; it is now upwards of 60,000, of whom about 10,000 are troops in the service of Mohammed Ali, and artizans employed in the arsenal and dock-yard. The other inhabitants are Turks, Egyptians, Arabs, Greeks, Jews, and Europeans. Alexandria is the chief commercial town of Egypt. All the products intended for foreign export are conveyed by the Nile and Mahmoudieh Canal to Alexandria for shipment. The Mahmoudieh Canal, which was restored and completed by Mohammed Ali in 1819, joins the Nile at Atfeh, 40 miles from Alexandria. Alexandria has become an important station in the line of communication with the East Indies, and its importance in this respect is annually increasing. Steamboats from England, Marseille, Trieste, and Constantinople, sail to and from Alexandria regularly, and goods and passengers, as well as mails, pass by the Mahmoudieh Canal and the Nile to Cairo, thence across the desert to Suez, then by the Red Sea and Arabian Sea to Bombay; and so from Bombay by the same route back again.

ALEXANDRIA, a city and port of entry in the United States of North America, in the district of Columbia, is situated on the west side of the Potomac, about 105 miles from the mouth of the river; 38° 49′ N. lat., 77° W. long. Ships of the line can ascend the river as far as Alexandria. Alexandria is seven miles S.S.W. from Washington: the communication across the Potomac is kept up by a wooden bridge a mile in length.

The town slopes down to the river with the streets at right angles to one another. It has a court-house, gaol, alms-house, a theatre, market-house, and ten places of worship. Good wharfs extend along the river about half the length of the city, and allow the largest vessels to come up to them. The chief exports are wheat, Indian corn, and tobacco. The population of Alexandria in 1830 was 8263; in 1840, 8459. The shipping in 1840 amounted to 14,470 tons.

The Chesapeake and Ohio Canal extends to Alexandria. The town is governed by a mayor, common-council, and 16 members.

(Haskel and Smith, *United States Gazetteer.*)

ALEXANDRIAN CODEX, a manuscript of the Old and New Testament, in Greek, now preserved in the British Museum. It was sent by Cyrillus Lucaris, patriarch, first of Alexandria, then of Constantinople, to Charles I.; was placed in the royal library in 1628; and continued there until that collection was removed to the British Museum in 1753. The history of the MS., before its transfer to Charles I., is involved in much uncertainty; and the real age and value of it have been much controverted. These points have been minutely discussed by Dr. Woide, formerly librarian of the British Museum, who published a fac-simile of the New Testament, in his preface. He is a staunch advocate of the excellence of the MS. A second edition of the preface (Notitia Codicis Alexandrini) was published by Spohn, who controverted many of Woide's opinions, showed that the MS. was by no means free from blunders of transcription, and reduced both its age and authority to a much lower standard.

The MS. is contained in four volumes, of the shape and size of large quarto, of which the New Testament fills the last. It is written on vellum, in double columns, in uncial or capital letters, without spaces between the words, accents, or marks of aspiration. The letters are round and well formed. Some words are abbreviated, but they are not very numerous. There is a variety both in the colour of the ink and the form of the letters. The MS. is on the whole in good condition; but sometimes the ink has eaten through the parchment; the shape of the letters, however, can generally be traced: sometimes the ink itself has scaled off.

The New Testament has been more fully described, and more carefully collated than the Old; from which, however, Grabe published his splendid edition of the Old Testament, Oxford, 1717—20. They are uniform in appearance and execution, but the Old Testament seems to be in rather better condition. It contains, besides all the canonical and most of the apocryphal books found in our editions, the third and fourth books of the Maccabees, the Epistle of Athanasius to Marcellinus, prefixed to the Psalms, and fourteen hymns, the eleventh in honour of the Virgin. Ecclesiasticus, the Song of the Three Children, Susannah, and Bel and the Dragon, do not appear to have formed part of the collection. The New Testament contains the genuine Epistle of Clement to the Corinthians, and part of the other which has been attributed to him. This is the only known manuscript in which the genuine Epistle exists. A fac-simile of the Old Testament has

been published by the Rev. H. Baber, of the British Museum.

ALEXANDRIAN LIBRARY, a collection of books, formed by Ptolemæus, the first king of Egypt; and probably the largest which was made before the invention of printing. It is said to have been founded about B.C. 284, in consequence of the suggestions of Demetrius Phaléreus, who had seen the public libraries at Athens. Demetrius was appointed superintendent of the new establishment, and busied himself diligently in collecting the literature of all nations, Jewish, Chaldee, Persian, Ethiopian, Egyptian, &c., as well as Greek and Latin. Eusebius says, that at the death of Ptolemæus Philadelphus there were 100,000 volumes in the library. It was situated in the quarter of Alexandria called Bruchion. Philadelphus purchased the library of Aristotle, and it was increased by his successors. Almost all the Ptolemies were patrons of learning; and at last the Alexandrian Library is said to have amounted to 700,000 volumes. But the rolls (*volúmina*) spoken of contained far less than a printed volume: as, for instance, the 'Metamorphoses' of Ovid, in fifteen books, would make fifteen volumes. This consideration will bring the number of books within the bounds of credibility.

In the siege of Alexandria by Julius Cæsar, a large part of the library was burnt. Gibbon (chap. xxviii.) asserts that the old library was totally consumed, and that the collection from Pergamus, which was presented by Marcus Antonius through Cleopatra, was the foundation of the new one, which continued to increase in size and reputation for four centuries, until, at the destruction of the Serapeion by Theophilus, patriarch of Alexandria, it was dispersed, A.D. 390. Still the library was re-established; and Alexandria continued to flourish as one of the chief seats of literature till it was conquered by the Arabs, A.D. 640. The library was then burnt, according to the story generally believed, in consequence of the fanatic decision of the Caliph Omar. [OMAR.]

Connected with the library of Bruchion was a college, or retreat for learned men, called the Museum, where they were maintained at the public expense. This establishment was subsequently transferred to the Serapeion, and continued to flourish till the destruction of the temple by Theophilus. The sciences of mathematics, astronomy, and geography, were cultivated by Euclid, Apollónius, Eratósthenes, and Ptolemæus the geographer. Criticism, philology, and antiquities, were also studied.

(Gibbon, *Decline and Fall*, c. 51.)

ALEXANDRINE VERSE, a species of verse which originated in France at a very early period, and has become the regular heroic verse of the French language. It consists of twelve syllables, subject to the rule that its sixth syllable shall always terminate a word. The English Alexandrine verse consists in like manner of twelve syllables. The longest and most remarkable poetical work in our language, written wholly in Alexandrine verse, is Drayton's 'Polyolbion.' In general, it is employed only occasionally in poems written in our usual heroic verse of ten syllables, and never except in the concluding line of the couplet or triplet. It also forms the closing line of what is called the Spenserian stanza. Regularly, it ought always, as in French, to be divisible into two hemistichs; but, in the freer spirit of our poetry, this rule is occasionally violated.

ALEXEI MICHAILOWITZ, born at Moscow in the year 1630, was a son of the Tzar Michâilo Feodorowitz Romanow, the first of the house of Romanow that held the sceptre of Russia, and of his second consort, Evdokia Lukianowna Streshnew. At the death of his father, July 12th, 1645, he succeeded to the crown, and as he was still very young, he was mainly guided by the advice of his councillors, Morosow, his tutor and brother-in-law; Miloslawskoj; and Plessow, a judge in one of the high courts at Moscow. The excessive avarice and despotism of these men caused an insurrection in Moscow, in 1648, in which Plessow and several of their creatures were murdered. The Tzar's intercession with difficulty saved Morosow from the people's fury.

The reign of Alexei was disturbed by two pretenders to the throne, of whom one was the celebrated Demetrius; the other was Ankudinow; and the support of their pretended claims by Poland led to a war with that country, in which the Polish commander-in-chief, John Radzivil, was completely defeated at Sklovo; the Russians took Smolensko in 1654, and almost the whole of Lithuania was conquered and devastated by them. The Poles, being at this time severely pressed by the Swedes, found it advisable, after two years' war, to agree to an armistice, which was concluded at Nienietz, in November, 1656, Austria being on this occasion the mediator. The Poles agreed to cede the provinces of Smolensko, Tshernigow, and Seweria to the Russians, for a sum of money.

Alexei's second war was against Charles Gustav of Sweden, which commenced before the armistice with Poland was concluded. The cause of complaint on the part of the Russians was, that Gustav had hindered the operations of their army in Lithuania. The war was long and destructive, but inconclusive, and Alexei at length agreed to an armistice with Sweden, which was signed on the 23rd of April, 1658, and three years after, on the 21st of June, 1661, was converted into a treaty of peace at Kardis, by which their former possessions were mutually secured to each party. A peace had also been concluded between Poland and Sweden, in 1660, at Oliva; but before its conclusion, the war between Russia and Poland had been renewed: this war was occasioned by the Cossacks on the Dnieper, who had revolted from Russia, and sought protection from the Poles. It lasted till 1667, and by an armistice concluded at Andruszow, Russia gained, in addition to former conquests, that part of the Ukraine on the other side of the Dnieper of which she had already got possession.

Immediately after the conclusion of the Polish war a formidable insurrection broke out among the Don Cossacks. Stenko Razün, a Cossack, resented the death of his brother, who had been

executed by order of a Russian general, and seduced his countrymen to revolt; they burnt and devastated the country from the lower Wolga to Jaik, took Astrakhan in 1670 (where Stenko ordered the Woiewod Prosorowskoy to be thrown over the walls), and several other cities.

Hopes were held out to Stenko which prevailed on him to present himself at Moscow, where he was executed as traitor and rebel: after this, tranquillity was easily restored among the Cossacks. Alexei's last war was against the Turks. Led by their hetman Dorosensky, the Saparogian Cossacks had revolted against the Poles, and made a treaty of alliance with Mohammed IV., receiving from him the province of Ukraine in fief. From this cause naturally arose a war between the Poles and the Turks; and Russia was not slow in interfering, and demanded that Azow, which originally belonged to Russia, and in 1642 had been taken from the Cossacks by the Turks, should again be ceded to Russia. But Mohammed's success did not dispose him to listen to the demands of Russia: he took the Polish frontier fortress Kaminieck, conquered the whole of Podolia in less than two months, and alarmed the Russians by the rapidity and success of his operations. The King of Poland, Michael, drew no advantage from the victory over the Tartars gained by Sobiesky at Kaluszo on the 18th of October, 1672, but made a hasty peace which was disgraceful to his country. But the King of Poland's peace was rejected by the Polish diet, and Alexei was glad to assist even a constitutional power in renewing hostilities against the formidable Turks; but finding his expected advantages not so great as he anticipated, his zeal abated, and he died before a peace with the Turks was concluded, on the 10th of February, 1676, in his 46th year.

Alexei Michâilowitz did much for the improvement of Russia; agriculture and manufactures were constant objects of his solicitude: he invited many foreigners to Russia, especially mechanics, artists, and military men, whom he treated liberally. He ordered many works, particularly on applied mathematics, military science, tactics, fortification, geography, &c., to be translated into Russian: he enlarged the city of Moscow, and built two of its suburbs. He likewise completely reformed the Russian laws. He moreover commenced and partly effected an extensive ecclesiastical reform, chiefly in matters concerning the liturgy. Alexei was twice married: his first wife was Maria Iljinishna Miloslawskoy, by whom he had five sons (two of whom, Feodor Alexeiewitz and Iwân Alexeiewitz, were his successors on the throne of Russia), and seven daughters. His second wife was Natalia Kirillowna Narishkin by whom he had one son, Peter Alexeiewitz (Peter the Great), and one daughter, Natalia Alexeiewna.

ALEXEI PETROWITZ, the eldest son of Peter the Great of Russia, and of Eudoxia, the first wife of that monarch, was born at Moscow in the year 1695. As he grew up he manifested a decided opposition to the reforms introduced into Russia by his father; and in 1716, when only 21, he secretly quitted Russia, proceeding first to Vienna and then to Naples. He was there induced to return to Russia, and to solicit his father's forgiveness; but Peter treated him with extreme harshness, compelled him to resign his pretensions to the crown, and finally had him tried and condemned to death. This was in the year 1718. The day after he was informed of his sentence Alexis was found dead in prison, and suspicions have been naturally enough entertained that a private execution accomplished the end, without incurring the risks or inconveniences of a public one. The prince, whose unhappy career was thus terminated, left a son, a child of three years old, who in 1727, on the death of Catharine I., became emperor under the title of Peter II. He reigned only three years.

ALEXIS COMNE'NUS I., emperor of Constantinople, ascended the throne in 1081, at which time the Turks had spread from Persia to the Hellespont; the frontiers of the Danube were threatened by swarms of barbarians; and the Normans, who were masters of Apulia and Sicily, had attacked the provinces on the Adriatic; but the most important event of Alexis's reign is the passage of the crusaders through his dominions. His conduct on that occasion has given rise to the most conflicting statements by various historians. It is certain that he contrived with great skill to obtain as much advantage of their assistance against the Turks as he could, to guard himself against their obtaining any undue predominance over him, and evinced indifference if not neglect in forwarding their objects in Palestine. The Latin historians therefore accuse him of bad faith, whilst his daughter, Anna Comnena, who wrote her father's life, extols his wise policy, dwelling with haughty indignation on the insolence and rapacity of the western barbarians. Alexis died in 1118, and was succeeded by his son, John Comnenus. His other son Isaac was the father of another John, who apostatized to the Turks, and married their sultan's daughter, and through whom, apparently, Mahomet II., centuries after, boasted of his Comnenian descent; and of the famous Andronicus, who, after a most adventurous career, usurped the throne in 1183, causing his relative, the youthful heir, Alexis Comnenus II., to be strangled. Andronicus was himself overthrown and put to a cruel death three years after, and in him ended the imperial line of the Comneni on the throne of Constantinople. Andronicus's posterity reigned afterwards over the province of Trezibond, with the pompous title of emperors. (See the various *Histories of the Crusades*, and the collection of the *Byzantine Historians;* and particularly the *History of* ANNA COMNENA.)

ALFE'NUS VARUS was one of the most distinguished pupils of the jurist Servius Sulpicius, the friend of Cicero. Pomponius ('Dig.' i. tit. 2) states that he became consul, and it is generally assumed that he is the P. Alphinius who was consul A.D. 2, and the same person as the P. Alfinius or Alfenus Varus of Dion Cassius (lib. lv. Index). But as Sulpicius, the master of Varus, was born about B.C. 106 and died B.C. 43,

it is not probable that Alfenus the jurist could be consul so late as A.D. 2.

Acron the scholiast (Horatius, 'Sat.' i. 3. v. 130) has a story that Alfenus was a shoemaker at Cremona, who came to Rome, where he became the pupil of Servius Sulpicius, and attained such distinction for his legal knowledge that he was made consul and had a public funeral. The passage of Horace and the remark of the scholiast have occasioned much discussion. (Wieland, *Horazens Satiren übersetzt*, note on *Sat.* i. 3. v. 130; Heindorf, *Des Q. Horatius Satiren erklärt.*)

Alfenus wrote a work entitled 'Digesta,' in forty books, from which there are excerpts in the Digest.

ALFIE'RI, VITTO'RIO, was born at Asti in Piedmont, in 1749, of a noble and wealthy family. Vittorio at nine years of age was sent to the college of the nobles at Turin, and at thirteen was admitted to study philosophy in the university of the same city. At fourteen he entered the army, and before he was twenty visited France, England, and Holland. His life was, for several years after, restless and dissipated.

In 1773 he returned to Turin, and began to write some scenes of a drama on the subject of Cleopatra, his first essay in Italian versification. In 1777, he went first to Siena and then to Florence, where he applied himself seriously to dramatic composition. He there also made the acquaintance of the Countess of Albany, wife of Charles Edward Stuart, called the Young Pretender. In 1782, Alfieri had completed fourteen tragedies, ten of which were printed at Siena. In 1785, the Countess of Albany having gone to live in France, Alfieri also repaired thither. Alfieri and the Countess (whose husband died in 1788) were living at Paris, when the French revolution drove them away. They returned to Florence, in which city he remained for the rest of his life. At forty-six years of age he began studying Greek, and by his own unassisted application he was enabled in two years to understand and translate the Greek writers. In complete retirement, pursuing his favourite studies, he lived till 1803 at Florence, where he died, at the age of fifty-five.

Alfieri gave to Italy the first tragedies deserving the name. The unities are strictly preserved, the characters are few; there are no subordinate incidents; and yet, notwithstanding this meagreness, there is so much power in the sentiments, nervousness in the language, and condensation of passion, that the performance of one of Alfieri's tragedies keeps an Italian audience spellbound.

His minor works are numerous, both in prose and poetry. His autobiography is a most amusing book.

ALFONSO V. of Aragon, and I. of Sicily, succeeded, in 1416, his father, Ferdinand I., who had annexed the crown of Sicily to that of Aragon. To these two Alfonso added that of Naples in 1435, on the death of Queen Joanna II., who had adopted him for her heir and successor, though his claim was contested by René of Anjou, who was supported by the court of Rome, and by Philip Maria Visconti, duke of Milan. After many vicissitudes René was driven from Naples, in 1442, and retired to Provence, where he reigned till his death; while Alfonso applied himself successfully to re-establish order and justice throughout the kingdom, which had long been a prey to misgovernment and confusion under the weak and corrupt reign of Joanna II. He was afterwards engaged in disputes with the popes, and in some other Italian wars, but on the whole favoured peace, and patronized the arts and literature. He collected a splendid library at a great expense, and caused translations to be made from the Greek of the works of Aristotle, Xenophon, &c. He also restored the aqueducts which supply the fountains with water, and drained the neighbouring marshes which infected the atmosphere; enlarged the mole and the arsenal, and raised the fine triumphal arch which forms the entrance of the Castelnuovo, which was then the king's palace.

Alfonso had no legitimate children; but he obtained a bull from the pope to legitimatize his natural son, Ferdinand, who succeeded him on the throne of Naples, while his brother, John, remained heir to the crowns of Aragon, Valencia, Sardinia, and Sicily. This John was afterwards succeeded by Ferdinand, called the Catholic, who reconquered the kingdom of Naples, which continued to be a dependency of Spain for several centuries. Alfonso died on the 17th of June, 1458.

ALFONSO II., of Naples, son of Ferdinand I., and grandson of Alfonso I., succeeded to the throne in 1494, and died in 1496. He had been engaged in the revolt of the barons against his father, and upon the approach of the French under Charles VIII., in the first year of his reign, he retired to a convent at Messina, where he practised great austerities, to atone, as he thought, for the crimes he had committed. He died soon after. Ferdinand II., his son, succeeded him, and, with the assistance of the Spaniards, drove away the French; but dying prematurely in 1496, was succeeded by his uncle, Frederic, Alfonso II.'s brother. (Guicciardini, *Storia d'Italia;* Porzio, *la Congiura dei Baroni.*)

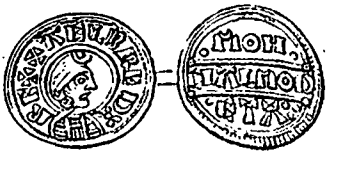
ALFONSO, kings of Spain and Portugal. [ALONSO.]

ALFORD. [LINCOLNSHIRE.]

ALFORT. [SEINE.]

ALFRAGANIUS, or AL-FARGANI, an astronomer who flourished in the earlier part of the ninth century.

ALFRED THE GREAT. This illustrious and excellent king was born in the year 849, at the royal manor of *Vanathing* (Wantage), in Berkshire. In a coin in the British Museum the name is Aelfred.



Alfred's father was Ethelwolfe, and his grandfather Egbert, both kings of the West Saxons; his mother was Osburgh, a daughter of Oslac, who was raised by his son-in-law to an earl's rank. Ethelwolfe had four sons—Ethelbald, Ethelbert, Ethered, and Alfred; and one illegitimate son, Athelstane. In the fifth year of his age Alfred was sent to Rome.

Asser, Alfred's biographer, states, that his noble mind thirsted for knowledge from the very cradle; that he took delight in listening to Saxon poems, and got them by heart; and that when his mother offered to her sons a book of Saxon poems as a prize to him who first should learn them, Alfred instantly went to his tutor, read the book, and repeated its contents to his mother.

Frequent as foreign invasions had been during the reign of Ethelwolfe, as well as during the two subsequent reigns of Ethelbald and Ethelbert, they became particularly formidable at the commencement of the reign of Ethered (866), when Alfred was eighteen years of age. At this early period Alfred seems to have been his brother's most valuable general.

The enemies with whom Alfred had to contend were Danes. By this term ought to be understood all the Scandinavian nations, viz. Danes, Swedes, and Norwegians indiscriminately, who, because they at that period spoke a common language, the *Norse* (then called *Danish*, or Dönsk Tunga, in foreign countries), went by the appellation which, strictly speaking, was peculiar to the most powerful of the Scandinavian tribes.

From 866 to 871 he was constantly engaged with these daring and skilful enemies, with varying success.

Ethered died shortly after Easter, in 871, and Alfred succeeded to the crown, being then twenty-three years of age. A month after his accession, though his forces were greatly inferior, he was compelled to a general engagement at Wilton with the whole army of the invaders: in the earlier part of the day he routed the enemy; but they at last kept the field; and during the three following years consolidated and recruited their power by more successful wars against other English rulers. Alfred's army was greatly reduced, and he could not now take the field with advantage. His embarrassments first suggested to him the idea of fitting out a fleet; and Alfred became the first founder of that naval power which in subsequent ages was to be an object of the world's dread and admiration. Alfred perceived that he had great advantages in fitting out a small flotilla to act in known seas, and on a dangerous coast (for most of the invaders landed between the Humber and the Thames), against invaders ill acquainted with its peculiar perils. The preservation of the West-Saxon monarchy was, in all probability, mainly owing to the existence of this small navy.

It is not within the province of this article to trace the military career of Alfred with that minuteness which more properly belongs to history. In 878 he sustained severe reverses. With a small troop he was obliged to conceal himself in woods and mountain fastnesses. Neotus, and, after him, Asser, says that he for a time sought refuge with one of his cowherds; who, it seems, so faithfully kept his master's secret, that he did not even tell his wife that the king was their guest. One day, while sitting near the fire pointing arrows and making a bow, she had set him to turn some cakes which she left on the fire: owing to Alfred's neglect the cakes were burned, for which she chid him, saying, that he was 'good at eating cakes, but bad at turning.' About Easter of the same year Alfred, with a few of his friends, took possession of a small island situated in the midst of a marsh formed by the stagnant waters of the Tone and Parret in Somersetshire. This island the Saxons called Æthelinga-igge; its modern name is Athelney. This inaccessible place he made still stronger by fortification; and from thence made frequent excursions against the foreigners. At Eddington he fought a great battle with the whole foreigna rmy, routed them, and pursued them to a stronghold, which he besieged during a fortnight. The invaders capitulated; and Alfred once more accepted four hostages and their solemn oath that they would leave his territory and receive baptism. Accordingly the king, Godrun, and thirty chiefs of his army, were baptized at a place near Athelney. Godrun ever after continued his faithful friend and vassal. His career was now generally successful; and, owing to his activity, bravery, perseverance, and success, in 886 he became, by common consent, sovereign of all England; excepting those parts of the north and east of which the foreigners still retained possession. A few years' interval of peace now followed, which Alfred employed in the most laudable manner.

A more formidable invasion than any of those which he had repelled yet awaited Alfred in 893. These invaders commenced offensive operations in the following year, and were now joined by the East Anglians and Northumbrians. Again the energy of the Saxon king repelled their attacks, after a long season of danger and difficulty. His coasts were also exposed to the attacks of pirates, whom he met and defeated with his accustomed decision of character.

During the two last years of his reign Alfred seems to have enjoyed some tranquillity. He died on the 27th of October, 901, being 52 years of age, and having reigned 29 years and 6 months.

Thus far goes the chronicle of Alfred's reign, or the bare recital of public events in which he acted for the most part as a leader, and where he always, in respect to talent, knowledge, policy, and character, maintains a lofty supremacy over his contemporaries. But he was as eminent in the cultivation of the arts of peace as in the struggles of warfare. He consolidated the Saxon monarchy; he built up and restored cities and towns; he compiled a code of laws; he organized the administration of justice; he was an indefatigable promoter of knowledge, translating himself some valuable authors, and portions of the holy scriptures; he encouraged the useful arts; he patronized travellers; he was the friend and correspondent of the most eminent scholars. He did all this

with a feeble constitution and under the sufferings of a chronic malady.

In his 20th year Alfred married Alswith, a daughter of Athelred, earl of Gainesborough. Alswith survived her husband four years. They had two sons:—1, Edward, surnamed the Elder, who succeeded his father, and 2, Ethelward; and three daughters.

(*The Saxon Chronicle;* Asseris Menevensis *Annales Rerum Gestarum Ælfredi;* Spelmanni *Vita Ælfredi;* Sharon Turner's *History of the Anglo-Saxons.*)

ALFRETON, a town in Derbyshire, 14 miles N.N.E. of Derby, and 140 N.N.W. of London. The population of the township in 1841 was 1774. The inhabitants are engaged in the manufacture of stockings and brown earthenware, or in the neighbouring collieries. The houses of Alfreton are irregularly built, and some of them very old; the church, an ancient structure, has an embattled tower with pinnacles.

ALGÆ is the name given by botanists to the tribe of plants which comprehends the sea-weeds, lavers, and fresh-water submersed species of similar habits. Some of them are only visible to the naked eye when they are collected in heaps; others grow together in the beds of the ocean, and when they rise to the surface form floating banks of such extent as to impede the course of ships.

The genera may be conveniently divided into three sections, *jointless, jointed,* and *disjointed;* of each of which we shall give a few illustrations.

1. *Jointless Algæ.*—These constitute the great mass of the order; they comprehend all the broad membrane-like sea and fresh-water species, as well as the large and tough tangles and dulses so common on our coasts. Their structure is extremely simple, consisting of roundish cellules, either adhering firmly to each other, or connected by a mass of transparent gelatine. When the plants fructify, they either form little cases, in which reproductive grains are enclosed; or some part of their cells changes its appearance, acquires a deeper colour, and finally drops in pieces; or the whole mass of each individual seems, when ripe, to separate into particles capable of reproduction.

It is in this division of the order that all the useful species, and those of large dimensions, are to be found. All the kinds that are consumed in the important manufacture of kelp [KELP]; the eatable sorts, which, in the state of birds'-nests, are collected in the islands of the Indian Archipelago and sold at a high price to the Chinese; those which we consume as laver; the species that afford vegetable glue; all those from which the elementary substance called iodine is obtained; and finally the principal part of what our farmers use for manure, belong to the great tribe of *jointless Algæ;* of which, 55 genera and about 160 species are known as natives of the coasts or ditches of Great Britain.

Of all the species, that which is the most common is the *Fucus vesiculosus,* a plant of which great quantities are cast upon our coast, and which is known by its strap-shaped, olive-green, forked divisions, having little yellowish oval uneven pods at their points, and by the crackling noise it makes when trodden upon.

Another extremely common kind, *Ulva bullosa,* is found floating in ditches and in stagnant pools, where it rises to the surface in green, blistered, slimy patches, which, to the naked eye, are merely a thin membrane of the most uniform texture. The common laver of the shops is very nearly the same thing, but is a marine species.

2. *Jointed Algæ.*—To this section belong the greater number of fresh-water species, and many of marine station. The jointed Algæ are commonly called *Confervæ,* and are instantly recognised by their having thread-like tubes, the joints of which differ in length and in the manner in which their contents are arranged. An endless variety of these little plants may be found in ditches and running streams; and their structure is not less interesting than simple. As far as we know, they multiply by means of little granules contained in their tubes, and they grow by the addition of one tube to the end of another. They never have the tubes collected into bundles, but are always thus simply constructed. The most remarkable among them are the *Zygnema* and *Oscillatoria,* both of which approach the animal kingdom, but in unequal degrees.

3. *Disjointed Algæ.*—At this point we have reached the organic limits of the animal and vegetable kingdom. Disjointed Algæ are characterized by their original or final spontaneous separation into distinct fragments, which have a common origin but an individual life. They may be compared to animals living in society, and only dispersing when the necessity of multiplying their race obliges them to do so. It is upon the stems of other plants, immersed in water, or floating in pools and ditches, that these curious productions are met with.

ALGÆ, FOSSIL. The remains of sea-weeds in a fossil state are less common than their probable abundance in the ancient ocean and the generally marine origin of the strata might have led to suppose. This arises perhaps from the cellular texture and destructible nature of the marine plants. Traces however of several genera occur in Silurian, carboniferous, liassic, oolitic, and later deposits.

ALGARDI, ALESSANDRO, an Italian sculptor and architect, was born about 1600; he became the pupil of Giulio Cesare Conventi, a sculptor of celebrity in his day; was employed at Mantua by the Duke Ferdinand, and was afterwards sent by him to Rome with an introduction to the pope's nephew, Cardinal Ludovisi, where he arrived 1625. The cardinal employed him chiefly in the restoration of ancient statues; and he received some employment from the Roman jewellers. His first original productions in Rome were two statues in stucco, for the Capella Bondini in the church of San Silvestro; but for many years he had no other occupation as a sculptor than that of restoring ancient fragments. About 1640 however his prospects changed; and during the remainder of his life he received many commissions for works of magnitude, which eventually established for him the reputation of the greatest sculptor of his age. The

principal of these are—the colossal group in marble, representing the decapitation of Saint Paul, for the church of the Padri Bernabiti, at Bologna; the monument of Leo XI., in St. Peter's; Attila checked by Saint Leo, an alto relievo of enormous size, for one of the altars of the same church; and the bronze statue of Innocent X., which was decreed by the Roman people, or senate, in consideration of his having completed the Capitol.

Algardi died of a fever in 1654. His reputation is nearly exclusively that of a sculptor, and as such he ranks amongst the greatest of the moderns.

(Passeri, *Vite de' Pittori*, &c.; Bellori, *Vite de' Pittori*, &c.; Cicognara, *Storia della Scultura*; Milizia, *Opere*.)

ALGAROTTI, FRANCESCO, was born at Venice in 1712. His father was a wealthy merchant. At the age of twenty-one he wrote an explanation of the system of Newton, adapted to the taste and understanding of female students. Having become acquainted with Frederic the Great of Prussia, when he was living in retirement as Crown Prince, Algarotti, after the accession of Frederic to the throne, was invited to his court; and he remained afterwards in the Prussian capital or at Potsdam the greater part of his life, as the friend and confidant of Frederic. Towards the latter part of his life, Algarotti, finding the climate of Prussia too cold for his declining health, returned to Italy. He died at Pisa, in 1764, in his fifty-second year. Algarotti was the friend and correspondent of most of the literary men and women of his time, Voltaire, Maupertuis, Metastasio, Bettinelli, Lord Chesterfield, Lady Wortley Montague, Madame du Boccage, &c. His chief merit is that of having rendered science and literature fashionable among the upper classes of his age and country.

ALGARVE, the most southern province of Portugal, is bounded N. by the Sierras of Monchique and Caldeirão, which separate it from Alemtejo, E. by the Guadiana, S. and W. by the ocean. It lies between 36° 56′ and 37° 56′ N. lat., and between 7° 14′ and 9° 3′ W. long.; its length from Castromarin to Cape St. Vincent is 96 miles, its mean breadth about 24 miles. The area is estimated at 2200 square miles: the population in 1823 was stated to be 127,615, or a little under 60 to the square mile.

Mountains occupy more than two-thirds of the surface of the province; these are but thinly inhabited, while the rich but narrow slip along the coast has a comparatively crowded population. Protected by its boundary of mountains from the cold winds of the north, Algarve produces the fig, citron, almond, date, lemon, orange, olive, vine, and the carob, or St. John's bread tree [CERATONIA SILIQUA], in the highest perfection. On the other hand, the extent of sea coast, amounting to more than 120 miles, has given a maritime character to the inhabitants, who benefit largely by the periodical visits of the pilchard from the northern seas, and the tunny from the Mediterranean, the sea marshes near Castromarin on the Guadiana furnishing the requisite salt. These fisheries supply the navy of Portugal with her most valuable sailors. The province is divided into three comarcas, which take their names from the chief towns, Faro, Tavira, and Lagos. Faro is a seaport town, with 8000 inhabitants, most of whom are engaged in fishing: it is also the seat of the bishop of Algarve. Tavira, which has a small harbour and a population of 9000, mostly fishermen, is the seat of the military governor of Algarve. Lagos, the capital of the province, stands in 37° 6′ N. lat., 8° 38′ W. long., 105 miles S. of Lisbon. The town, which is on the Bay of Lagos, is well built, has an aqueduct which supplies several fountains with water, three churches, and two hospitals. The inhabitants amount to 8000, and are actively engaged in the tunny, pilchard, and anchovy fisheries. Villa Real, at the mouth of the Guadiana, is a well-built town, which commands the entrance to the river; population 2000. Sagres, the most south-western point in Europe, deserves mention as the residence of the enlightened Prince Henry, to whom the Portuguese are mainly indebted for their fame as geographical discoverers. Monchique, in a picturesque situation in the interior, is much frequented for its hot springs; population 3000. Silves also, in the interior, on the navigable river Portimão, has a population of 3000. The name Al-garve is Arabic, and means 'the west.'

(*Géographie Universelle*; Miñano; Balbi.)

ALGEBRA. This word is derived by contraction from the Arabic phrase *Al jebr e al mokābalah*, the nearest English translation of which is *restoration and reduction*. So short a definition is of course useless. We shall endeavour to give the first and most simple view of this science, our limits not permitting us to go, even in the smallest degree, into its operations.

In establishing the rules of arithmetic, it is always necessary to use general reasoning: that is, reasoning the nature of which would not be altered if other numbers had been chosen, different from those which were really employed in the question. For example: If 2 acres let for 13*l.* how much will 17 acres let for? It is shown immediately that the number of pounds required is that obtained by multiplying 13 and 17 together, and dividing the product by 2: and it appears, moreover, that by the same reasoning a similar rule might be established when the numbers are different from those given above, provided the form of the question remains the same. That is, if any number of acres we please to name, cost a certain number of pounds, the price of any other number of acres may be found by multiplying that other number by the number of pounds the first acres cost, and dividing by the number of the first-mentioned acres. Thus we have established a general rule, and the steps by which we translate this into an algebraical expression are as follows. We invent short signs to signify that multiplication and division are to take place: we express the former by putting × between the numbers which are to be multiplied together, the latter by writing the divisor under the dividend, and drawing a line between them. The foregoing rule then stands as follows:

$$\text{Price in pounds of second No. of acres} \Big\} \text{ is } \frac{\text{Second No. of acres} \times \left\{\begin{array}{l}\text{Price in pounds of}\\ \text{first No. of acres.}\end{array}\right.}{\text{First No. of acres.}}$$

So far we have abbreviated by using *two symbols of operation;* to which we may add that we write + between two numbers which are to be added together, and − between two numbers of which the second is to be taken away from the first. Now suppose that, to catch the eye, we put a letter whenever a number is named in the question, in order that by looking for that letter we may quickly find out in what part of the result the aforesaid number is used. For example: If a certain number of acres (a) cost a certain number of pounds (b), how many pounds will another number of acres cost (c)? The answer is, as above,

$$\frac{\text{Second No. of acres } (c) \times \left\{\begin{array}{l}\text{Price in pounds of}\\ \text{first No. of acres}\end{array}\right\} (b)}{\text{First No. of acres } (a).}$$

The last step is, to let the letters themselves stand for the several numbers; which will save the necessity of writing words in the result. Our final algebraical way of writing the question will then be—If a acres cost b pounds, how much will c acres cost? The answer is

$$\frac{c \times b}{a} \text{ pounds, usually written } \frac{c\,b}{a} \text{ pounds.}$$

The earliest treatise on algebra of which we can fix the date within two centuries is that of Diophantus, an Alexandrian Greek, who is generally supposed to have lived before the fourth century, but who we think has been shown to have written about the end of the sixth century, at the earliest. It is very unlike a modern treatise on algebra, and consists altogether of a species of problems which have since received the name of *Diophantine*, in which it is required to solve certain questions, the answers to which shall be whole numbers only. It is so like the Hindoo algebra in its character, that it is impossible to suppose the two wholly unconnected. [VIGA GANITA.]

The Persians and Arabs confessedly derived their knowledge of the subject from the Hindoos. We do not, however, find that they proceeded as far as their masters: for the Arabic treatises, so far as we know, contain only the solution of equations of the first and second degree, and their application to various arithmetical questions, excluding all mention of indeterminate equations.

It was by means of the treatise of Mohammed Ben Musa, who lived in the time of the Caliph Al Mamun, that the science was introduced into Europe. A complete and able translation of this work, by Dr. Rosen, with the original Arabic, was published in 1831 by the Oriental Translation Fund.

Thus much of the science was introduced into Europe, or rather into Italy only, at the beginning of the thirteenth century, by Leonardo Bonacci of Pisa. Algebra lay dormant in Italy, without receiving any material improvement, till the middle of the sixteenth century, when it was introduced into Germany, France, and England, nearly about the same time, by Stifel, Pelletier, and Robert Recorde, respectively. The Hindoos, instead of using the letters of the alphabet, designated various unknown quantities by the names of different colours; the Persians and Arabs employed the word answering to 'thing' in their language for the unknown quantity, and the Italians adopted the word 'cosa' for the same purpose: hence algebra came to be called the *Regola de la Cosa* in Italy, and the *Cossike Art* in England. It is to be observed, however, that in no country, up to the time of Vieta, were general symbols used to signify anything but quantities sought; those *given* being always certain numbers, and never arbitrary representations of numbers in general. Hence the simple word '*thing*,' or any abbreviation of it, was sufficient for their purpose.

While algebra was being introduced into the various countries of Europe, the Italians began to make the first steps towards its improvement. The solution of an equation of the third degree was discovered by CARDAN and TARTAGLIA; that of the fourth by Ferrari; while various other discoveries were made by BOMBELLI and MAUROLICO. We must refer the reader to the several lives of these mathematicians. VIETA, a Frenchman, who died in 1603, made the grand improvement of using symbols to stand for known as well as unknown quantities, and with the additional power derived from this improvement, laid the first steps of the general theory of equations. In England, HARRIOT, who died in 1621, carried on and extended the discoveries of Vieta; and from the time of the two latter we must date the modern form of the science.

Our limits will not allow us even to name the crowd of discoverers who have extended this branch of pure mathematics since the time of Vieta. We must refer to the work of Hutton, 'Mathematical Tracts,' to Bonnycastle's translation of Bossut's 'Histoire des Mathématiques,' or to the original work itself: to the preface of the mathematical part of the French Encyclopédie; or to the histories of Montucla, Cossali, and Libri. The first and second are the most likely to fall in the way of the English reader.

The only necessary preliminary to the study of algebra is a good knowledge of the four rules of arithmetic, and of common and decimal fractions. Without so much it is impossible to read any work with profit; and in the want of it we must look for the reason why the science appears repulsively dry to most persons. On this subject, we refer the student to some remarks in page 59 of the treatise on the 'Study of Mathematics' published by the Society for the Diffusion of Useful Knowledge.

The science of algebra, which commenced its existence as a generalization of arithmetic, was soon embarrassed by the well-known difficulties of *negative quantities* and *impossible quantities*. The answer to a problem would frequently appear in the form of an impossible subtraction, such as 3—8 or 0—12. In such cases it was soon seen that for the most part (for that it is always so was not made clear at first) such answers arise from having looked for the result in a wrong direction.

Thus, in a question of time, if the answer, supposed to be hours *after* a certain epoch, present itself as 8 — 8 or as 0 — 12, it is a sign that it should be 8 — 3 or 12 — 0 hours *before* that epoch. This interpretation, combined with the discovery that the forms which require it may be used by the same rules as those which are arithmetically intelligible, makes the transition from pure arithmetrical algebra to one of positive and negative quantities present no very great difficulty. And the signs + and −, instead of being looked on as standing for addition and subtraction, must be considered as merely implying opposition of meaning: whatever + 1 may stand for, − 1 stands for as much of the diametrically opposite kind.

When this difficulty was settled, there arose another, namely, that even in the algebra of positive and negative quantities, the *square root* of a negative quantity was found to have no existence. It is only in recent times that a fair insight into the state of the case with respect to this difficulty has been arrived at. Referring to the 'Supplement to the Penny Cyclopædia' [ALGEBRA] for a further account of this matter, we shall here only endeavour to give a glimpse of the mode in which light has been thrown upon the real power and extent of algebra.

The representation of truths by means of *symbols* is a language; and every language has rules of structure which constitute its syntax. These rules are not necessarily entirely dependent on the meaning of the words in the mind of a student, whatever may have been their original derivation. That it is *homo loquitur* and not *homo loquuntur*, does not depend upon *homo* meaning a man rather than any thing else, but upon *homo* meaning *one* man rather than two or more. In a similar manner, the structure of algebraical language has a syntax, the forms of which are frequently dependent upon a part and not the whole of the meaning. For example, the laws of addition in arithmetic are found not to depend upon the *whole* notion of number. To count 6 + 8, as written, is to go through the process of forming 8, only making 6 a beginning instead of 0. And it is a sufficient direction to form $a + b$, still in arithmetic, if we say 'proceed from a in the same manner as you proceed from 0 in forming b.' Here number is not mentioned, nor even alluded to: and it may be perfectly possible to obey the preceding direction in a case in which a and b do not stand for numbers, and the process of formation is not counting.

When the rules of algebra are separated, and with them only such parts of their meaning as are essential to their description, it is found that the same rules, under the same descriptions, may and do admit of being deduced from other notions of magnitude, of which number is only a part. For example, simple length is connected with number, but length admits of an infinite number of modifications which are independent of number; which we express by saying that a line of a given number, say of feet, may take an infinite number of different directions. On this subject-matter, namely, length considered as having a definite direction, is founded *one* algebra: and this algebra is found to give no difficulty about the square root of its negative quantity. Some idea of the reason why may be given as follows:—

To multiply by 49, the square of 7, is to multiply twice following by 7: and if 10 had a finite square root, it would be because there would be a fraction the multiplying twice by which would be equivalent to one multiplication by 10. If it be the structural property of $\sqrt{-1}$, that $\sqrt{-1} \times \sqrt{-1}$ is the same as -1, it follows that we impose upon multiplication by $\sqrt{-1}$ the necessity of standing for an operation which, repeated twice, changes the magnitude under consideration into its opposite, without destroying it at the first step: for other conditions, which it is equally necessary to satisfy, prevent $\sqrt{-1}\,a$ from being 0, except when a is 0. Now in considering length affected by direction, we have a distinct conception of such an operation: for the turning of a line through a right angle is a process, which repeated a second time, turns the line a into the directly opposite line signified by $-a$. And it is found that, in this system of algebra, $\sqrt{-1}\,a$ must be interpreted as a line, having a direction at right angles to that of the line represented by a.

This system, being new, has of course some opposition to encounter; but very little, all things considered. Some of it has arisen from the idea that its supporters mean to contend that the above interpretation is the only one; and that algebra, for complete explanation, must be founded on the joint notion of length and direction. But no such assertion is made. If any one will undertake to assign a commercial process of such a kind, that one process changes a gain (without destroying it) into something distinctly conceivable as neither gain nor loss, but something intermediate, and the second process turns that intermediate state into a loss—then those who take the widest view of algebra are prepared to adapt the system to business, and see the way in which it can be done. And the same with respect to other ideas of magnitude.

ALGEBRAIC, as distinguished from Transcendental. [TRANSCENDENTAL.]

ALGEBRAIC GEOMETRY, a name given to the application of algebra to the solution of geometrical problems. For the principal points of interest connected with it, see ABSCISSA, ORDINATE, CO-ORDINATES, CURVE, CURVATURE, EQUATION, TANGENT.

ALGECI'RAS, a sea-port town of Spain, on the western side of the bay of Gibraltar, which is about seven miles across, in 36° 8′ N. lat., 5° 26′ W. long.; population 4500. The town is supplied with water by an aqueduct, and contains a dockyard and a citadel, which is in ruins. Coal, found in the neighbouring mountains, corn, and brandy, are the only important articles of commerce. Algeciras was taken from the Moors by King Alfonso the Avenger in 1344, after a siege of two years. The name is Arabic, and means 'the Island.'

ALGECIRAS, or ALGIZIREH. [MESOPOTAMIA.]

ALGERIA, or ALGE'RIE. [ALGIERS.]

ALGHERO a town on the west coast of the

island of Sardinia, in 40° 33′ N. lat., and 8° 18′ E. long., about fifteen miles south of Sassari. The town stands on the shore, and is built on a low rocky point, jutting out from a sandy beach. It is surrounded by stout walls, flanked with bastions and towers. The streets are narrow, but well paved and cleanly. There are two entrances through gates, one at the mole or landing-place on the north, and the other at the ravelin in the land front. Alghero contains a cathedral, twelve churches and convents, and several public schools. The population is about 7000. There are some fountains of pure water outside the town, but within the inhabitants obtain their supply by means of cisterns. The town stands in a spacious bay, formed on the north by the south point of Cape Caccia, and on the south by Cape Marargin. The anchorage within is good. (Smyth's *Sketch of the Present State of Sardinia.*)

ALGIERS, *Territory of*, frequently called, since its occupation by the French, *Algeria*, or *Algérie*, is bounded by the Regency of Tunis on the east, by the Empire of Marocco on the west, by the great desert of Sahara on the south, and by the Mediterranean Sea on the north. Its greatest length from the river Zayne on the Tunis frontier to Twunt on the western frontier, is about 550 miles; its breadth cannot be stated with precision, but exceeds in some parts 200 miles.

Surface and productions.—The chain of the Atlas Mountains runs through the whole length of the country; and its various ridges, with the intervening valleys, occupy the greater part of its surface. A central ridge, or succession of ridges, marks the boundary between the Tel, or country fit for tillage, and the Sahara, and divides the waters that run into the Mediterranean from those that flow southward and lose themselves in the marshy lakes of the interior, the Shott and the Melgigg. This ridge contains a few lofty peaks often covered with snow, among which are two supposed to have been known to the ancients as Mons Zalacus and Mons Ferratus. Besides the Great Atlas, another group, known to geographers by the name of Little or Maritime Atlas, rises nearer the coast from the mouth of the river Shelif, whose bed divides it from the central chain, and running between its northern bank and the sea, forms the heights called Summata, Teneah, and Magrouah, which divide the plain of Metidja, in the immediate district of Algiers, from the province of Titteri.

The principal river of Algiers is the Shelif, which has its sources within the borders of the Sahara, south of the Wannashrees Mountains; it afterwards approaches the Little Atlas, and reaches the sea after a course of 300 miles. During the rainy season it overflows a great tract of country, so as to interrupt the communication by land between Algiers and Oran. The other rivers are—the Yisser, to the east of Algiers; the Zowah, or river of Bujeiah; the Wad-el-Kebeer, Ampsaga of the ancients, which flows into the sea north of Constantina; and the Seiboos, or river of Bona. There are also two marshy plains, periodically overflowed by small rivers.

The climate of the country north of the Atlas is generally healthy and temperate, but when the *khamsin*, or south wind, blows, the thermometer rises sometimes to 100° of Fahrenheit, and even more; this, however, lasts only from two to five days. This wind is dry, and although depressing, is not otherwise unhealthy. It carries along penetrates quantity of extremely fine sand, which with it a into the houses and through every crevice. From July to October the surface of the country is burnt by the rays of the sun; near the coast, however, the sea-breeze cools the air during the day, and heavy dews fall at night. The atmosphere is very pure and bright, but is considered unfavourable to persons of weak sight. Ophthalmia is a common disease, as well as cutaneous disorders, and even elephantiasis, owing principally to the want of cleanliness in the country people. No bad fevers or other endemic diseases are prevalent.

The fertility for which this country was renowned in ancient times still continues; in the valleys which are watered by streams vegetation is extremely luxuriant. The mould is of a very dark colour; in some places it is reddish, and impregnated with nitre or salt. The hills are covered with fruit trees of every kind, and the fruit is generally exquisite. A species of the lotus is found here, the fruit of which is eaten. The palm is indigenous, but the dates come from the southern side of the Atlas. Few timber trees are to be seen except a species of oak, the *quercus ballota*, which bears a very nutritive kind of acorn. The mountains near Bujeiah used to supply the dockyard of Algiers with timber. There are many species of the cypress and chestnut trees. There are also very extensive plantations of *nessri* or white roses; these flowers are much larger than those of Europe, and yield the essence known by the name of attar of roses. The sugar-cane grows in this country; a species of it called Soleyman rises to a great height, and gives more sugar than any other species known. The *indigofera glauca* thrives also. The grain sown is wheat, barley, Indian corn, millet, doura, and also rice.

Among the animals of Algiers are most of the domesticated kinds. The cows are small, give but little milk, and generally lose it altogether with the loss of the calf. Algiers and Marocco are the original countries of the Merino sheep. Goats are very numerous, and supply the people with milk. The horses are well known to be excellent. The asses are uncommonly fine, and much used for riding; the country people eat the flesh of the young ones. The mules are also excellent. The camel is considered superior to that of Asia, and good cheese is made of its milk. The interior of the country abounds with wild boars, porcupines, antelopes, and all sorts of game. In the fastnesses of the Atlas are panthers and leopards, but no tigers; the lion still maintains the character of its Numidian progenitor for superior strength, fierceness, and also, at least according to Arab report, for its occasional forbearance and generosity. In the desert of Angad on the borders of Marocco are large flocks of ostriches. The country is infested by various venomous reptiles and insects, especially scorpions of large size, whose bite is dangerous.

There are also serpents of the boa kind. The locusts pay occasional visits, when they destroy the harvest of whole districts in a few days; the tribes south of the Atlas eat them.

Inhabitants.—The races that inhabit the territory of Algiers (exclusive of the French colonists) may be reckoned seven in number: Berbers or Kabyles, Arabs, Moors, Turks, Cooloolis, Jews, and negroes from Soudan.

One half of the whole population consists of *Kabyles*, the aborigines of the land: although somewhat mixed with the various nations that have successively conquered the country, they still retain much of their Numidian character and habits. The name of *Berbers* is of uncertain origin, and they themselves are unacquainted with it; they call themselves Mazigh or Amazirgh. The Moors call the Berbers Kabyles, from Kabileah, 'clan.' The Kabyles inhabit the whole of the mountainous country, both along the great and the little Atlas chains, while the Arabs occupy the intermediate plains. The Kabyles live in villages called *dashkrahs*, consisting chiefly of huts which they call *gurbie*, made of mud and loose stones, covered with branches of the palm-tree, and thatched with turf or straw. They appear to be an industrious race in regard to agriculture, mining, and manufactures generally. They make guns, ploughs, and many coarse utensils, which they sell to the Arabs and Moors; they know how to temper steel, and also make sabres and knives of a tolerable quality. They manufacture gunpowder for their own use, but they never sell any of it. Common woollen and linen stuffs, olive oil, and soap made from soda and oil, are among their manufactures. The furniture of their huts is very simple; a few sheepskins or mats spread on the ground, or on a wooden platform in a corner, serve them as beds; their *hykes*, which resemble in shape the plaid of the Highlanders, and their *boornooses* or cloaks with hoods, which constitute their dress by day, serve them as blankets at night; a few baskets, earthen dishes, pots, and jars, for their milk and honey; they keep their grain and fruit in large vats made of clay baked in the sun, or bury them in holes under ground. The Kabyles have their own sheiks or chiefs, and religious leaders called marabouts; their religion is Mohammedan, but they do not join with the Moors in the celebration of it. Whoever may be the governors of Algiers, the Kabyles seem to be nearly independent of them: forming a community of their own in the mountain districts. Further details are given under BERBERS.

The *Arabs* who encamp in the plains are known also by the name of Bedoweens or Bedouins. These Arab tribes are the remains of the various great immigrations of their countrymen from the east, and have kept themselves distinct from the other races around them. They speak the Koreish or eastern Arabic with more or less purity; are strictly observant of the Koran, are governed by their elders or sheiks, and are all tributary to the bey of their respective province. Their habits and customs resemble those of the Arabs described under ARABIA.

The *Moors* constitute the bulk of the population of the towns and the districts immediately around: they are a very mixed race, sprung from the various nations who have successively occupied the country; the Arabian stock, however, which was engrafted on the population existing at the time of the Mussulman conquest, may be supposed to predominate. Their number was much swelled by the Moors who were driven away from Spain. The Moors are further advanced in civilization than the Arabs or the Kabyles; they are used to the comforts of towns; many of them are wealthy, and fond of luxury and pleasure; but their moral character stands very low. They are not deficient in intelligence. All the boys frequent the schools, where they learn reading, writing, and arithmetic at a trifling cost; elementary instruction having been established at Algiers for ages past on a method somewhat resembling the Lancasterian. The Moors speak the Moghrebin or western dialect of the Arabian language. A further account of them is given under MOORS.

The *Turks*, who for more than three centuries were the rulers of Algiers, formed a militia which seldom amounted to ten thousand: and though it was at last reduced to five thousand, even this small body kept the whole population in perfect submission. They were nominally at least under the orders of the sultan, as lord high sovereign of the country. The Dey was selected from among their own body. The power of these Turks has, however, wholly fallen since the occupation of the country by the French.

The *Cooloolies*, the offspring of Turks by Arab or Christian women, were said to amount to 17,000 in the city of Algiers alone. Some of them entered the Turkish militia, others were employed in various offices under government; many are possessed of property, which their fathers or themselves have acquired; but, like the Turks of Algiers, they have now no power.

The *Jews* came in great numbers to Algiers on being driven out of Spain and Portugal in the fifteenth century. They are reckoned to be between 40,000 and 50,000, living in the principal towns, chiefly on the coast. They are, as everywhere else, brokers, agents, jobbers, retailers, hawkers, and some of them are merchants and bankers. Despised and ill-used by the Turks, they were still necessary to them in all money transactions, in all maritime speculations, and in their financial operations. They exercised by this means considerable influence on the members of the government. Many of them grew rich, though in continual dread of losing both their property and their lives. Their condition is greatly improved under the French.

The *Negroes* are slaves brought from Soudan by the caravans, or kidnapped by the Bedoweens of the Desert. Between 4000 and 5000 were, under the sway of the Turks, brought every year into the territories of Algiers, one half of whom were taken to the capital, where they were exposed in the bazaar, and sold partly to wealthy Moors or Turks, and partly to speculators who exported them by sea to the Levant.

Towns.—The two principal towns are described

under ALGIERS and CONSTANTINA. Among the others is Bona, near the site of Hippo, the see of St. Augustine, with a capacious harbour nearly choked with mud. To the eastward of Bona were La Calle and Bastion de France, two old French settlements which were destroyed in 1827, and near which the coast is frequented by the coral-fishing boats from France and Italy. Westward of Bona is Jijel or Jiljili, a harbour and a fort: the Kabyles of this mountainous coast are the most ferocious of the whole country, and merciless plunderers of wrecks. Bujeiah, on the gulf of the same name, once a place of considerable importance, with a good harbour, carried on some trade in oil and wax, the produce of its territory. In the interior of the vast province of Constantina are many remains of cities once famous, such as Seteef, once the capital of the Mauritania Sitifensis; Tiffesh, once Thebestis, in a very fertile plain, which extends towards the Mejerdah or Bagradas river; Tipsa, the ancient Tipasa, a frontier town towards Tunis. In the same neighbourhood is Gellah, also a frontier town, built on a mountain almost inaccessible, a place of asylum for the outlaws of the two states, who countenance one another, and live in a sort of wild freedom. The whole province of Constantina (the ancient Cirta) is full of interesting ruins, which have been but little examined in modern times. In the province of Titteri is the town of Medeyah, the residence of the bey, in a fertile district in the midst of the Little Atlas; it once reckoned above 10,000 inhabitants, but has suffered severely in the several conflicts between the French and the Arabs and Kabyles. Belida, situated between Medeyah and Algiers, on the borders of the fine plain called Metidja, has been equally unfortunate: Shershel, Mustigannim, Arzew (the ancient Arsenaria), and El Callah, are among the smaller towns of the country. Two of the most important towns are Oran and Tlemsin. Oran is a fortified place, and carries on some trade by sea. The Spaniards were masters of it for near three centuries until 1792, as well as of the neighbouring Marsa el Kebir, the Portus Magnus of the ancients, a natural harbour, one of the best on the coast of Barbary. Oran has become a place of importance in the hands of the French. The old Tlemsin, once the capital of a kingdom, was much larger than the present town, but was almost wholly destroyed in 1670 by Hassan Dey of Algiers. The present city is the fourth city in rank, next to Algiers, Oran, and Constantina. There are manufactures of carpets and blankets, and some trade carried on with the interior. It is not far from the borders of the Sahara, which here approaches very near the coast. Mascara, S.E. of Oran, is also a place of some trade.

The territory south of the Atlas comprises two districts, the *Zaab* and the *Wad Reag*. The Zaab (ancient Gætulia), contains many villages inhabited by an industrious population of Arab stock. The Wad Reag contains a group of villages inhabited by Kabyles.

History.—The territory of Algiers includes the several divisions of ancient Numidia, both of the Massyli and of the Massæsyli, the kingdoms of Massinissa and his rival Syphax, and afterwards of Jugurtha. It also includes part of the Mauritanian kingdoms of Bocchus and of Juba. It was conquered successively by the Romans, the Vandals, the Byzantine Greeks, and lastly by the Arabs, who invaded North Africa at the beginning of the eighth century, and established Islamism. Ferdinand the Catholic, after driving the Moors from Spain, sent an expedition to Africa under Cardinal Ximenes and Don Pedro Navarro, which took possession, in 1509, of Oran and Marsa el Kebir, and of Bujeiah in the following year. The Moors of Algiers called in the aid of a Turkish corsair, named Horush; who, after vanquishing the Spaniards, claimed possession of Algiers itself. The country in 1519 became a province of Turkey, governed by a pacha or regent appointed by the sultan. The first who filled this office was Khair-ed-din, the brother of Horush. He manned a large fleet, with which he swept the Mediterranean, striking terror among the Christian sailors. Soliman I. called him to Constantinople, and raised him to the rank of Capudan Pacha, or Great Admiral. Hassan, a Sardinian renegade, who succeeded him in the regency of Algiers, continued to scour the sea, and make incursions on the coast of Spain. Charles V., in the plenitude of his power, was baffled in his attack upon Algiers in 1541. A terrible storm dispersed his fleet, and the army was obliged to re-embark in the greatest confusion. From that epoch the Algerines thought themselves invincible, and extended their piracies not only all over the Mediterranean, but also into the Atlantic. They seized the vessels of all nations who did not agree to pay them a tribute.

Admiral Blake first taught the Algerines to respect the flag of England. Louis XIV. caused Algiers to be bombarded in 1683 by Admiral Duquesne, which led to a peace in the following year between France and Algiers. The Spaniards, under General O'Reilly, landed near Algiers in 1775, but were obliged to re-embark in haste and with loss. The Dutch, after several combats with the Algerines, by paying a sum of money obtained respect for their flag. So did likewise the Danes and Swedes. The Austrian and Russian flags were protected by the special interference of the Porte, in consequence of treaties with the latter. But the Italian states were the greatest sufferers from the piracies of the Algerines and the other Barbary powers, who not only seized their vessels and cargoes, but made slaves of all on board, who were either sold in the market, or sent, chained, to the public works. In 1815 the Algerine power was checked in its lawless exactions by the ships of the United States, which took an Algerine frigate and brig; the Dey was also compelled to conclude a treaty with the Americans, renounce all tribute, and pay them 60,000 dollars as compensation for the ships that had been plundered. Lord Exmouth, in execution of the determination taken by the congress of Vienna, put an end to Christian slavery in 1816, by bombarding the city of Algiers, and bringing the Dey to terms on this and other subjects. A

better state of things lasted for about eleven years, when an insult offered by Hussein Pacha, the last Dey, to the French consul, in April, 1827, induced the French government to send an expedition on a very large scale to take possession of Algiers. This was effected in June, 1830. Algiers capitulated to General Bourmont; the Dey abdicated, and retired to Europe; and the French took possession of the town, of the fleet, and of the treasury, where they found above two millions sterling in precious metals and stores.

Before tracing the further proceedings of the French, it may be as well to remark, that the Turkish chief was known by the several titles of Dey ('Uncle'), Pacha, Effendi, and Baba ('Father'). He was elected by the bashis or officers of the militia, assembled in dewaun, or rather by a faction of them, which also frequently shortened his reign by a violent death. Few sovereigns of Algiers for the last two centuries have died a natural death. Any common janissary might aspire to the supreme rank. The sultan formerly used to appoint the Pacha of Algiers, who was at the same time commander of the forces, and to send men and money for the service of the garrison; but the Turkish militia obtained in the seventeenth century the right of choosing their own commander, and paying themselves out of the revenue of the regency.

French Conquest and Colonization.—By the capitulation of the 4th of July, 1830, the French became possessed 'of the city of Algiers, and the forts and harbours depending on it.' No mention was made of the provinces, or of the native tribes, over which the authority of the Dey was little else than nominal. It is from this circumstance that the French have lost so much blood and treasure in extending their possession of the country. The Moors inhabiting the towns of Algiers, Oran, and Bona, became subjects of France; but the Arabs and Kabyles of the open country followed their own tactics; and even the Turkish beys of provinces showed a disposition to join with the Arabs and Kabyles rather than with the French invaders. In 1830 Marshal Bourmont, and afterwards Marshal Clausel, were engaged in contests with the Arabs and Kabyles, at Bledah near the Little Atlas, and at Medeyah, the capital of the province of Titteri. Clausel deposed the Bey of Titteri, and placed a Moor of Algiers in his place.

In 1831 negotiations were entered into with the Bey of Tunis, by which the two provinces of Constantina and of Oran, the two great eastern and western divisions of the state of Algiers, were to be administered by two princes of the reigning Moorish dynasty of Tunis, with the title of beys, on their paying an annual tribute to France. But these arrangements did not lead to much good. Marocco showed hostile intentions on the west, which were only allayed by diplomatic means. Clausel returned to Europe, and General Berthozène had some hard fighting with the Kabyles and Arabs, to whom he was forced to yield up Medeyah.

In 1832 Algiers was under Savary, duke of Rovigo, a commander who so mismanaged his duties as to make himself and the French hated throughout the country.

In 1833, while General Voirol was governor of Algiers, General Clausel tried to induce the French government to establish a system of colonization to that country. The government agreed to favour private enterprise in that direction, but declined to make the subject a national one. It was then stated that the expenditure for Algiers amounted to 30,000,000 francs annually; that the revenue from thence was only 1,500,000; and that 30,000 French soldiers were employed in retaining it. In that year the French generals in Africa found a formidable antagonist in Abd-el-Kader, the Bey of Mascara, who placed himself at the head of all the Arabs in the western parts of the country, to oppose the French.

In 1834 Count d'Erlon was appointed governor of the colony, and chiefs were placed over the civil and judicial departments. The principal military events of the year were, some skirmishes with Ahmed Bey of Constantina, and the recognition, by the French governor, of Abd-el-Kader as bey of the Algerine territory westward of the river Shelif.

In 1835 Abd-el-Kader showed the mode in which he viewed this concession to his power. He crossed the Shelif with a large Arab force, and exhibited great military talent in a contest with General Trézel. Marshal Clausel and the Duke of Orleans set out from France, and employed 10,000 men in driving Abd-el-Kader back into the interior, but without any other definite result.

In 1836 Clausel headed an expedition to Tlemsin, the head-quarters of Abd-el-Kader, which he took, and drove the Arab chief further into the interior. He also defeated some of the Arabs elsewhere, and re-conquered Medeyah from the Kabyles, which was then placed in connection with Algiers by a military road. Clausel having after this again returned to Europe, Abd-el-Kader renewed his attacks; and it required another French army under General Bugeaud to repulse him, and relieve Oran and Tlemsin. In the same year another army, under Clausel and the Duke de Némours, attempted to gain Constantina, but were repulsed with heavy loss.

In 1837, as a means of ensuring the conquest of Constantina, the French wished to purchase the neutrality of Abd-el-Kader, and Marshal Bugeaud succeeded in making a treaty with the Arab chief. This being accomplished, a powerful army under General Danrémont and the Duke de Némours effected the conquest of Constantina (though with a heavy loss), by which the French influence became much increased in the centre of the country.

In 1838 the French were busy in consolidating their power at Constantina, establishing trustworthy officers, and gaining possession of the surrounding districts. In the mean time Abd-el-Kader was employed in extending his power in the district ceded to him, but without molesting the French.

In 1839 the Duke of Orleans visited Constantina, strengthened the French position there, and

received the submission of many Arab and Turkish chiefs. In the autumn of the same year Abd-el-Kader showed that he had been recruiting his strength for another attack on the French, and the French government were forced to send out another army of 20,000 men to Africa.

In 1840, although there were 60,000 French troops in Algiers, little was done to put down the power of Abd-el-Kader. Skirmishes took place throughout the year.

In 1841 Marshal Bugeaud succeeded in regaining Mascara and the Metidja plain from Abd-el-Kader, and discomfited the Arabs in various directions.

In 1842 hostilities continued throughout the year. Abd-el-Kader received many reverses; but no sooner was he discomfited at one place than he appeared in renewed vigour at another.

In 1843 the Duke d'Aumale surprised the camp of Abd-el-Kader, who himself narrowly escaped, and many of his supporters were defeated elsewhere; but the French afterwards indulged in 'razzias,' or predatory incursions, more in the manner of roving Arabs than of Europeans.

In 1844 the adherents of Abd-el-Kader succeeded in frustrating an attack of the French sent out from Constantina; and the chief himself, who had taken refuge in Marocco, induced the Moors of that country to join him in hostility to France. Hence arose war between France and Marocco, in which General Bugeaud soon compelled the emperor to sue for peace. By the terms agreed upon, the Emperor of Marocco was not to allow Abd-el-Kader to remain in his dominions.

In 1845 the French reputation was tarnished by the destruction of 500 or 600 Moors, who had taken refuge in a cavern, where they were suffocated by the smoke from burning faggots placed at the entrance. In September of the same year Abd-el-Kader again came into action, and nearly destroyed a squadron of 500 French cavalry.

In 1846, 300 French prisoners, who were in the hands of Abd-el-Kader, were murdered on April 27; and at various periods during the year skirmishes took place between his adherents and the French.

It thus appears that for sixteen or seventeen years after the nominal conquest of Algiers, the French have been obliged to fight their way, in order to maintain and extend their hold of the country, at an enormous expenditure of men and money. The career of Abd-el-Kader is not the least remarkable circumstance connected with this subject.

The internal administration of 'Algérie,' or the State of Algiers, is by the king's ordonnances managed as follows:—A governor-general, who is a military officer of high rank, has the supreme command of the troops, and is also at the head of the civil and political administration. He is under the orders of the minister-at-war at Paris, where a department of the War Office is especially engaged with the affairs of Algiers. The governor-general is assisted in his functions by a council of administration, consisting of the director of the interior, the commandant of the naval force on the Algiers station, the military intendant, the attorney-general, and the director of the finances. A secretary-general of the government attends the sittings of the council.

The director of the interior has under him subdirectors at Oran, Bona, and Philippeville. Algiers, Oran, Bona, and Philippeville have municipal councils and maires. In the other towns, as at Constantina, there are civil commissaries, mostly natives, styled Hakhem.

The country is now divided into three provinces. 1. Algiers Proper, which includes also the old division or province of Titteri. 2. Oran. 3. Constantina and Bona. The principal military stations are twenty-four in number, and the naval stations five.

For the department of justice there are courts of the first instance at Algiers, Oran, Bona, and Philippeville. Appeals are made to the Royal Court, which sits at Algiers. There are justices of the peace at Algiers, Bledah, Bona, Oran, Philippeville, and Constantina. Algiers has a tribunal of commerce.

The public instruction is under an inspector. The establishments for instruction are—a college at Algiers with 15 professors; gratuitous courses of Arabic, both vulgar or oral, and written; communal schools; a museum, and a library. There is a Roman Catholic bishop of Algeria, and there are consistories for the Protestants at Algiers and Oran.

The European inhabitants, not military, settled in the various towns of Algeria, amounted, in 1845, to about 60,000, and they are increasing rapidly by fresh arrivals. Since 1841 a number of villages have been built on the Sahel, or tableland round Algiers, each of which contains from fifty to sixty families of French colonists, chiefly emigrant farmers with a small capital. The government has granted them allotments of ground, on condition of their cultivating them and building their own houses. These villages have been surrounded by a ditch and towers, thus forming a chain of fortified outposts round the capital. Each village has its fountain, its church, a town-house, and a school.

(Shaw's *Barbary;* Rehbinder, *Ueber den Algierschen Staat;* and modern accounts by Shaler, Rozet, Lord, and the *Almanach Africain,* a useful annual guide book.)

ALGIERS, in Arabic *Al Jezira,* 'the Island,' the capital city of the territory of Algiers, is situated in 36° 49′ N. lat., 3° 25′ E. long. It was first built about 935 by Jussuf Zeri, an Arabian chief, of the Zeirite dynasty, which succeeded that of Aghleb in the sovereignty of the country. It is in the shape of an irregular triangle, of which one side is formed by the sea-coast, and the other two run up the declivity of a steep hill which faces the N. and N.E.; the houses rise gradually one above the other, so that there is scarcely one that has not the prospect of the sea from its terrace. The houses are square, and mostly two stories high; they have a closed court in the middle, on which, and not on the street, the windows of the apartments open. The flat terrace at the top is the resort of the family, especially in the evening, to

enjoy the sea breeze. The buildings are all painted white, and the reflection of the sun from them is very painful to the eyes. The circumference of Algiers is little more than two miles; the streets are very narrow, the widest being only twelve feet in breadth. Since its occupation by the French, the inhabitants, buildings, and customs of Algiers have undergone so much change that it is becoming every year more a European than a Moorish town. The hills, which rise in the form of an amphitheatre around the city, are studded with country-houses, gardens, vineyards, and olive groves. Algiers is well supplied with water from a large reservoir, the water of which is conveyed from the country by an aqueduct, and then distributed by conduits all over the city.

ALGO'A BAY is an inlet on the south coast of Africa, about 20 miles wide from east to west, and nearly 500 miles E. of Cape Town. The anchorage of Algoa Bay has good holding ground, and for six months of the year, when the north-west winds prevail, is perfectly secure, but during the remaining months a heavy sea rolls in from the south-east. The tide rises in the bay from six to seven feet. The shore is a level sandy beach; it receives the waters of the Zondag, Zwartkop, and Kowie rivers, and has also some fine springs of water on the western side. The surrounding country forms part of the district of Uitenhagen. Port Elizabeth, in 34° N. lat., 25° 35′ E. long., is about five miles N.W. from Cape Recif, the western point of Algoa Bay, and about 20 miles S.E. from Uitenhagen.

ALGONQUINS, the name of a tribe of North American Indians, of which there are some small remnants in Lower Canada. [NORTH AMERICAN INDIANS.]

ALGORITHM, a corruption from the Arabic, the root being a word which means calculation, or at least refers to calculation or reckoning. When the Indian numerals were introduced from the East, this word came with them, and the new figures were denominated (by Chaucer, for example) *augrime* (or algorithm) figures. The word is tolerably well naturalized among the French mathematicians, as meaning the system of notation: thus there is an algorithm of functions, and an algorithm of the differential calculus, &c. It has also been used by English writers, but our language does not want it; the word *notation* does just as well.

ALGUACIL, an officer in Spain answering to the English bailiff. The name is from the Arabic 'el-vazil,' or from the Hebrew verb 'gazal,' which means 'to catch.' The common alguacils are appointed by the judges. The alguacil mayor is a superior officer, whose functions are the same as those of the common alguacil. He is appointed by the common council, of which he is a member. The duty of an alguacil is at present confined to the apprehension of criminals; the office of executioner, which he also formerly filled, being now discharged by the *verdugo*. (Covarrubias, *Tesoro de la Lengua Castellana.*)

ALHA'MA, a town of Spain, 26 miles S.W. of Granada: near it are mineral baths, which are much frequented. Its population is 6300. There is another Alhama 19 miles W.S.W. of Murcia, which also has mineral waters, and a population of 3500. The name is said to be Arabic, and to mean 'warm baths;' it is applied to several other small places in Spain.

ALHAMBRA, properly Alambra, a small town of Spain, in the province of La Mancha, 40 miles E. of Ciudad Real, in 38° 59′ N. lat., 2° 59′ W. long. It contains many inscriptions, and other Roman antiquities; and there can be little doubt that it marks the site of the town called Laminium in the 'Itinerary' of Antoninus.

ALHAMBRA, an ancient castle and palace of the Mohammedan kings of Granada. It was begun by Ibnu-l-ahmar in 1241, continued by his son Abu'abdillah, and finished by his grandson, Mohammed III., about 1314. It occupies the site of the Kassabah al-hamra, the 'red inclosure,' and was originally called the Kasru-l-hamra, the 'red palace,' of which the present name is a corruption. The Alhambra is situated on a hill, which runs out to the east of the town of Granada. It is surrounded by a strong wall, flanked by square towers, and inclosing an area of 2500 feet in length, and 650 in breadth. The walls follow all the windings of the mountain, and are constructed of 'tapia,' an artificial concrete, consisting of pebbles, rubble, and lime, put moist into a wooden frame. When the mortar was set, the frame was removed, and the portions were used successively in building the walls, which grew harder by time. The colour is reddish, and hence the name 'al-hamra,' 'the red.' The river Darro flows by the base of the hill, on the east, north, and west.

The exterior appearance of the Alhambra is simple and severe, and gives no indication of the gorgeous beauty which once distinguished the interior. Having ascended the hill from the city of Granada, a natural terrace is reached in front of the Torre de Justicia, the Gate of Justice, which

Gate of Justice.

is the grand entrance. A fine tank in front of this gate is now filled up with rubbish. The Torre de Justicia, so called because justice was

dispensed there after the manner of the East, is a square tower, with a double entrance-gate, the horse-shoe arch in front rising to half the height of the tower. An inscription on a stone in this tower mentions the date when it was completed, A.H. 743 (A.D. 1343). Having passed through the double entrance-gates, a narrow passage conducts to the Plaza de los Algibes, or 'Court of the Cisterns,' which are two, the largest 102 feet long and 56 wide, arched over, and inclosed by a wall six feet thick. In these cisterns the water from the river Darro deposited its sediment, and was kept cool for the use of the castle.

On the east side of this Plaza is the Alcabaza, which is a palace built for Charles V. in the Cinquecento style, by the architect Alonso Berreguete. On the north is a very simple and unostentatious entrance to the Mesuar, or common bathing-court, 150 feet in length and 56 in width. It is paved with white marble, and the walls covered with arabesques of admirable workmanship. In the midst of this court is a basin sufficiently large to swim in, bordered with parterres of flowers, beds of roses, and rows of orange trees. This court was designed as a common bath for servants and other dependents of the palace, and supplied with water the fountains of the other apartments.

At the lower end of the Mesuar is an archway leading to the Patio de los Leones, or 'Court of the Lions.' It is open to the sky, measures 100 feet by 60, and is paved with white marble. In the centre of it is a large basin of alabaster, of twelve sides, resting on the backs of twelve lions, rudely carved. Over this basin a smaller one rises, from which a large body of water spouts into the air, and falling from one basin into the other is sent forth through the mouths of the lions. This court is surrounded by a gallery supported by above 100 slender and elegant columns, 9 feet high, and 8½ inches in diameter. These columns are very irregularly placed; sometimes they are single, and sometimes in groups of two or three. The walls, up to the height of fifteen feet from the ground, are covered with blue and yellow mosaic tilings. The columns and ceiling of the gallery are beautifully ornamented with arabesques and fret-work in the most exquisite taste. Around the upper face of the Fountain of the Lions are some Arabic verses, which describe, in a style of oriental hyperbole, the wonders and the beauty of the fountain. On each end of the court projects a portico, which is also supported by slender marble columns.

On the left side of the Court of the Lions is the Sala de los Abencerrages, and opposite to the Sala de los Abencerrages, on the other side of the Court of the Lions, is the Sala de las dos Hermanas, or 'Hall of the Two Sisters,' so called from two huge flags of white marble, without a flaw or stain, which are in the pavement. On the upper end of the Mesuar stands the magnificent Tower of Comares. This massive tower rises above the rest of the building, and overhangs a deep ravine, which descends almost perpendicularly to the river Darro. The prospect from this tower is truly magnificent. The delightful valley through which the Darro flows, part of the city of Granada, and the beautiful plain in which it stands, present an enchanting natural panorama. The Sala de los Ambajadores, which occupies the whole of the interior of the Tower of Comares, still preserves traces of its past splendour. The walls are richly stuccoed and ornamented with arabesques of exquisite workmanship. The ceiling is of cedar-wood, inlaid with ivory, silver, and mother of pearl. The three sides of the hall are full of windows, formed in the immense thickness of the wall, which thus allow a free circulation to the air, and admit a faint light which produces a surprising effect. In the same manner all the halls of the Alhambra are lighted and ventilated. To the east of the Sala de Comares is the Tocador de la Reina, or Queen's Dressing-room, and near it is the Garden of Lindaraja, with its alabaster fountain, and groves of roses, myrtles, and orange-trees.

At a short distance from the Alhambra rises the Cerro del Sol, or 'Sun Mountain,' on which the Generalife is situated, a palacial villa where the Mohammedan kings spent the summer months. It is built in the same style as the Alhambra. Its situation is highly picturesque. Here are fountains spouting above the loftiest trees, numerous cascades, terraces placed in amphitheatre, and the immense cypresses which once overshadowed the kings and queens of Granada.

When we examine the halls of the Alhambra, we are no less surprised at the elegance of their construction and the beauty of their ornaments than at the durability of a work of such a delicate nature; the blue, the carmine, and the gold still preserve all their brilliancy and freshness; the slender columns and apparently fragile filagree work have stood the vicissitudes of five centuries. Much damage was done to the Alhambra by General Sebastiani, in 1810, which has since been partially repaired.

The Alhambra has a governor, who generally lives at Granada. It is guarded by a body of *invalidos*, or retired veterans, who serve as guides to the visitors.

(*Swinburn's Travels in Spain;* Murphy's *Arabian Antiquities of Spain;* Ford's *Handbook for Spain.*)

ALHAZEN, or ALLACEN, properly Al-Hassan, a mathematician of the eleventh century. He was a native of Basra. Relying upon his skill in mechanics, he engaged to construct a machine by means of which the inundations of the Nile could be made productive of the same advantage, whether they exceeded or fell short of the average height. The caliph, Hakim, heard of this, and bestowed rich presents on Al-Hassan, hoping that he would fulfil his engagement. But when Al-Hassan had made himself better acquainted with the nature of the river, he perceived that he had undertaken an impossibility; and in order to avoid the consequences of Hakim's anger at his disappointment, he feigned insanity till Hakim died. He lived at Cairo, where he supported himself by copying books, and devoted his leisure hours to study and original composition. He died A.D. 1038.

ALI BEN ABI TALEB, surnamed by the Arabs *Asad Allah*, and by the Persians *Shir-i-Khodu*, i. e. the Lion of God, was the fourth caliph or successor of the Arabian prophet Mohammed in the government of the new empire founded by him, and occupied the throne during the years 35-40 after the Hegira (A.D. 655-660). He was the cousin-german of Mohammed, and had from his childhood lived under his care and protection. When the latter announced himself as a prophet, Ali, then ten or eleven years old, was, according to tradition, the first man who acknowledged his divine mission. From these circumstances, and also on account of his marriage with Fatima, the daughter of Mohammed, Ali appeared to have strong claims to the commandership over the Faithful, when the prophet died (A.D. 632) without leaving male issue. Three other associates of the prophet, Abu Bekr, Omar, and Othman, were, however, successively appointed caliphs, before Ali came to the throne (A.D. 655); and his son Hassan, who succeeded Ali in 660, was in the ensuing year obliged to resign the government to Moawia, the first caliph of the Ommaiade dynasty. The controversy concerning the respective rights of Abu Bekr, Omar, and Othman, on the one side, and of Ali ben Abi Taleb and his lineal descendants on the other, has given rise to the schism of the Sunnites and Shiites in the Mohammedan community. [ABU BEKR.] After a reign of only five years, occupied entirely with civil and foreign wars, he was assassinated with a poisoned sword in his residence at Kufa, and died after three days (A.D. 660), at the age of fifty-nine, or, according to others, sixty-five years.

Ali had by Fatima three sons, Hassan, Hossain, and Mohsen: the latter died very young. Hassan succeeded his father for a short time in the government, and with him terminated, according to Arabic historians, the *legitimate* caliphat, i. e. the succession of those caliphs who had been appointed by the free choice of the Faithful. [ABU BEKR.]

ALI, HYDER. [HYDER ALI.]

ALI PACHA, a celebrated Albanian chief, was born about 1750, in the little town of Tepelen, in the pachalik of Berat, on the left bank of the river Voioussa, the ancient Aous, at the foot of the Klissoura mountains. Ali's family was distinguished by the name of Hissas, and had been for ages settled in the country; it belonged to the Albanian tribe or clan of the Toske or Toxide, who boast of being old Mussulmans. One of Ali's ancestors, after being for some time a klephtis, or highway-robber, made himself master of Tepelen, and assumed the title of Bey, holding it as a fief of the pacha of Berat. Ali's grandfather distinguished himself in the Ottoman service by his bravery, and was killed at the siege of Corfu against the Venetians, in the beginning of the eighteenth century. His son Vehli Bey, the father of Ali Pacha, was a good, quiet, liberal-minded man, very partial towards the Greeks. The neighbouring beys or feudal Albanian chiefs combined against him, and deprived him of the greater part of his estates; but the mother of Ali was a woman of masculine courage, though of cruel disposition, and, on her husband's death, secured the succession to her own son Ali, then fourteen years of age, by the adoption of the most unscrupulous means.

The early life of Ali was passed in the usual vicissitudes of a predatory warfare, and sufficiently varied by a succession of adventures possessing the interest of romance, though marked by ferocity, treachery, and most other atrocities. His power, however, continued to become gradually consolidated, and several of the surrounding districts submitted to him, until at length his riches gave him the means of intriguing at the Porte. He then obtained the secret commission of executing the 'firmaun of death' against Selim Pacha of Delvino. In reward for this service he was appointed lieutenant to the new Derwend Pacha of Roumily, in which office he enriched himself by sharing with the klephtis the produce of their spoils. In consequence of this traffic the ronds soon swarmed with robbers; repeated complaints reached the Porte, and the Derwend Pacha was recalled and beheaded. The lieutenant also, being summoned, instead of appearing, sent presents to several members of the divan, and thus evaded punishment.

Ali's reputation for bravery and decision was, however, established at Constantinople, and when the war broke out in 1787, between the Porte and the two courts of Austria and Russia, he was appointed to a command in the army under the vizier Jussuf. Having distinguished himself in the field, he was next appointed to the pachalic of Tricala in Thessaly, and was moreover named Derwend Pacha of Roumily. He now raised a body of four thousand men, all Albanians and old klephtis, with whom he soon cleared the roads of robbers, and thus won merit with the Porte. He now turned his views towards Jannina, the capital of southern Albania or Epirus, where utter anarchy prevailed. Assisted by his friends in the town, he entered it and took possession of the citadel. He then, by bribery and other means, got himself confirmed in the pachalic which he had usurped; and by a vigorous despotism extinguished all factions, restored tranquillity, and the people were satisfied with the change. The Porte, seeing this so long turbulent province reduced to subjection, forgave Ali for a deception of which the divan had been apprized only when it was too late.

Ali extended his dominion over all Epirus, and also into Acarnania and Ætolia or western Greece, by successfully attacking the revolted Armatoles or Greek militias who, under the corrupt and supine Turkish government, infested instead of protecting the country. He attacked the Suliotes, a people inhabiting a mountainous district about thirty miles S.S.W. of Jannina. After a brave and protracted resistance of more than ten years, the Suliotes agreed to evacuate their country in December, 1803, but on attempting to retreat, in order to embark at Parga, Ali's soldiers fell upon them, and the scenes that followed were dreadful. None of the Suliotes surrendered; almost all perished. In one instance, a small party, being completely

surrounded, retreated towards a precipice, the women leading the way; being arrived on the brink, they first threw their children into the abyss below, after which they all, husbands and wives, fathers and sons, brothers and sisters, linked hand in hand, ran down the declivity, and mutually impelled each other into the precipice, in sight of their disappointed enemies. Only a few, who escaped before the attack, managed to reach Parga, and thence embarked for Corfu, at that time occupied by the Russians. A remnant of these unfortunate exiles were subsequently, under the auspices of England, restored to their native country. But Ali was shackled on the sea-side of his dominions. He therefore attacked and reduced in succession the fortress towns on the coast of the Adriatic and the Gulf of Arta, which, formerly dependencies of Venice, were then in the hands of the French, of which Prevesa and Parga were the most eminent. Their capture was attended with almost every circumstance of ferocity and cruelty that can make war revolting.

Ali extended his dominions to the north into Albania Proper, by the conquest of the pachalik of Berat, which he effected more by intrigue than by force. He likewise occupied the government of Ochrida in Upper Albania, by joining in the attack ordered by the Porte against the rebellious pacha of Skodra, or Scutari, and then kept it for himself. The Porte was obliged to wink at these usurpations. Ali was even appointed for a twelvemonth Roumily-Valicy, or supreme inspector of the principal division of the empire, and he went to reside at Monastir, at the head of 24,000 men. His extortions in Roumelia were very great. His own dominions in the latter part of his life extended over all Epirus, one-half of Albania Proper, part of Thessaly, and the whole of western Greece, from the Lake of Ochrida on the north, to the Gulf of Lepanto on the south, and from Mount Pindus to the Adriatic. Ali was now vizier or pacha of three tails: his second son, Vehli, was made pacha of the Morea; and his elder son, Mouktar, a thorough soldier, distinguished himself in the service of the sultan during the campaign of 1809 against the Russians. The youngest of all, Salih Bey, who was his father's favourite, and destined to succeed him, was brought up with particular care under good tutors and teachers.

Ali Pacha, although hated by the Porte, might have ended his days in peace; his power made him feared, and his advanced age was an inducement to the sultan to wait patiently for his natural death. But an attempt to procure the assassination of one of his confidants who had abandoned him, and obtained an appointment in the seraglio at Constantinople, aroused the ire of the sultan. Ali was excommunicated, and all the pachas of Europe were ordered to march against him. This was at the beginning of 1820, and at length Ali was compelled to abandon Jannina, and to surrender himself on being promised the sultan's pardon. His own perfidy was now retorted on himself. He was murdered; his head was cut off and sent to Constantinople, where it was exhibited before the gate of the seraglio. His sons shared their father's fate. Thus Ali Pacha, at seventy-two years of age, closed his guilty but extraordinary career, in February, 1822.

The character of such a man is easily ascertained from the account of his life. The cruelty of his revenge was truly fiendish. His administration rested upon the principles of terror; he certainly extirpated the robbers and other criminals, and rendered his territories perfectly secure from all depredations but his own. This security, in a country like Turkey, was felt as a boon, and commerce improved in some measure by it. Jannina became one of the most flourishing towns of Turkey, and its population had increased to 40,000 inhabitants. Ali was a Mussulman only by name: he fully protected the Greeks, and other Christians, in the exercise of their religion, and allowed them to have schools, and even a lyceum and a library. Ali treated all his subjects, Albanians, Turks, or Greeks, alike, and without partiality; the Turks were perhaps those who liked him the least, because he did not allow them to ill-use the rest of the people, as in other parts of Turkey.

A'LIAS, in legal proceedings, denotes a second or further description of a person who has gone by two or more different names. For example, if the same person is known by the name of John Smith as well as the name of John Thomson, he is described in civil and criminal pleadings, and in legal language generally, as John Smith, *alias dictus* (otherwise called) John Thomson.

A'LIBI, a Latin term, which signifies 'in another place.' If a person charged with an offence committed at a certain time and place, shows that he was *elsewhere* at that time, he is said to prove an *alibi*. If true, this is obviously the best proof of innocence; but no kind of defence offers so ready an opportunity for false evidence.

ALICANTE, a modern province of Spain, formed of the southern portion of the kingdom of Valencia and a small part of Murcia. It is bounded N. by the province of Jativa, W. by that of Chinchilla, S.W. by Murcia, and S.E. by the Mediterranean: its length is 73 miles, its breadth 68 miles, and the population is stated to be 255,170. The province is mountainous in the north, and mostly level in the south. The soil in the north is calcareous; that of the plains in the south is rich and fertile to an extraordinary degree. The climate is the mildest in Europe, winter being scarcely known, while the heats of summer are moderated by the sea breezes. The inhabitants are very industrious, and cultivate the land with great care: irrigation is much and successfully employed. Wheat is little cultivated, but rice, oranges, citrons, figs, almonds, and dates, are grown in large quantities; barilla, the sugar-cane, the cotton tree, and all equinoctial plants flourish. The quantity of wine produced is considerable, and of the best quality, especially that grown in the environs of the city of Alicante. Linen, broadcloth, soap, paper, and worsted-yarn are manufactured: there are several brandy distilleries in the province. Great attention is paid to the rearing of silk-worms and bees, and the

tunny, anchovy, and other fisheries on the coast are very productive. The chief towns are Alicante, Onteniente, Denia, Gandia, Alcoy, Orihuela, Monovar, Elche, and Elda. The province is within the jurisdiction of the captain-general of Valencia, and of the court of Royal Audience of Valencia. (*Géographie Universelle;* Balbi, *Géographie.*)

ALICANTE, a well-built sea-port town in 38° 20′ N. lat., and 0° 29′ W. long., situated in a bay of the Mediterranean, in the province of Alicante in Spain. The town is built on a peninsula, at the foot of a hill, which has a fortified castle on its summit more than 1000 feet above the sea: population 25,000. The town is not well built and contains no remarkable buildings. There are six churches, two hospitals, and several other charitable establishments. More than 900 ships, Spanish and foreign, enter the harbour of Alicante yearly. The greater part of its foreign trade consists of imports of linen from France and Genoa, tobacco from the United States of America, and cod-fish from Newfoundland; its exports are, barilla and almonds to England and Ireland, and wine to Brazil and the coast of Barbary. A considerable quantity of wine is also shipped to the port of Cette, in Languedoc, whence it is sent to Bordeaux, to be mixed with the inferior Medoc wines. Alicante likewise exports oil, olives, brandy, and soap: the quality of the last-mentioned article is much esteemed. The communications between the town and the contiguous country are for the most part kept up by means of small coasting vessels of from 20 to 70 tons burthen, the roads being so exceedingly bad, that such goods as are sent by land must be conveyed on the backs of mules and asses. The wheat required for the consumption of the inhabitants is mostly brought from places far inland, and for the reason just given, its cost is nearly doubled by the time of its arrival at Alicante. The port of Alicante is an open bay, between the Cape de la Huerta and Plana Island, distant from each other about 10 miles in a north-east direction. Ships on entering the port may steer between these points in any course direct for the castle, and come to anchor in four to eight fathoms water. The port has no pilot, nor indeed is one necessary. There is no perceptible tide in the port of Alicante; the depth of water varies from fifteen to four fathoms, according to the distance from the shore: neither bar nor shallows are to be passed in entering. Ships mostly lie in the bay at the distance of from a quarter of a mile to a mile from the shore. They are not exposed to any danger from winds, currents, or other casualties when at anchor, and during the last 20 years no case has occurred of a vessel being driven from her moorings. A mole or quay has been constructed, alongside which small vessels can lie, in order to take in or discharge their lading.

Alicante stands on the site of the ancient town of Lucentum. During the peninsular war, in 1812, when the French general, Suchet, succeeded in making himself master of the rest of the kingdom of Valencia, Alicante had the honour of successfully resisting the invaders.

ALICA'TA, surnamed l'Amata, 'the beloved,' is a city on the south coast of Sicily, 24 miles S.E. of Girgenti, in 37° 4′ N. lat., and 13° 55′ E. long: population 12,000. The town is built on the right bank of the river Salso, which divides the provinces of Noto and Mazzara; it is favourably situated for trade, and exports considerable quantities of grain, maccaroni, pistachios, almonds, and sulphur. The anchorage is about a mile south-west of the town, in from 7 to 12 fathoms water, with a good clay bottom, but ships are much exposed in winter 'to all the winds from east to west round southerly.' Alicata is used as a military position, but the fortifications are now in ruins. The remains of the ancient Gela are near the town.

ALICU'DI. [LIPARI ISLANDS.]

ALIEN. An alien is one who is born out of the ligeance (allegiance) of the king. (Littleton, 198.) The word is derived from the Latin *alienus;* but the word used by the English or other law writers in Latin is *alienigena.* The condition of an alien, according to this definition, is not determined by place, but by allegiance [ALLEGIANCE], for a man may be born out of the realm of England, or without the dominions of the king, and yet he may not be an alien.

The native subject of a foreign country continues to be an alien, though the country becomes a part of the British dominions. Persons born in Scotland before the union of the crowns by the accession of James I., were aliens in England after that event; but those who were born afterwards were adjudged to be natural-born subjects. Persons born in any of the colonial possessions of Great Britain are considered native subjects.

The children of ambassadors, and other official residents in foreign states, have always been held natives of the country which they represent, and in whose service they are. All children born abroad, whose fathers or grandfathers on the *father's* side were natural-born British subjects, are now deemed natural-born subjects, unless their fathers were liable to the penalties of treason or felony, or were in the service of a prince at war with Great Britain. (25 Ed. III. st. 2; 7 Anne, c. 5; 4 Geo. II. c. 21; 13 Geo. III. c. 21.)

The children of aliens born in England are, as a general rule, the same as natural-born subjects. But the children of a British mother by an alien are aliens if they are born out of the king's allegiance.

An alien cannot hold lands in England even for a term of years. If he purchase lands, he takes them, but they are forfeited to the king after the fact of purchase has been ascertained by a jury empanelled for that purpose, which is called an office found. An alien of course cannot take land by descent, nor can he be entitled to land by the courtesy of England. An alien woman is not entitled to dower of her husband's lands, unless she has been either made a denizen or naturalized. There seems to be no legal principle which shall prevent an alien from *taking* by devise, any more than from taking by purchase: the only question is, for whose benefit he *takes,* for he cannot hold it for his own benefit. (Ld. Hardwicke; Knight,

v. Duplessis, 2 Ves. 360.) An alien cannot be returned to serve on a jury, except where he is one *de medietate linguae*, that is, a jury of which one-half are foreigners.

An alien may possess moveables, money in the funds, and other personal effects. The Great Charter declares that 'all merchants shall have safe and secure conduct to go out and to come into England; and to stay there, and to pass as well by land as by water, to buy and sell by the ancient and allowed customs, without any evil tolls, except in time of war, or when they are of any nation at war with us.' ('Magna Charta,' art. 48.) An alien merchant may occupy a house and premises, and may hold a lease for years for the convenience of merchandize; yet if he assigns the lease or dies, in the one case his assignees, and in the other case his executors or administrators, cannot have the lease, but it goes to the crown. It is usual in such cases for the crown to make a grant of the forfeited interest to some person who is the best entitled to it. By 3 & 4 Wm. IV. c. 54 and c. 55, aliens cannot hold British registered shipping nor shares in a British ship. A naturalized person cannot enjoy the advantages of a British subject under commercial treaties with foreign countries until seven years after he has been naturalized. An alien cannot be a member of parliament, nor can he vote in the election of a member of parliament. (2 & 3 Wm. IV. c. 45.) The Municipal Corporations Act (5 & 6 Wm. IV. c. 76, s. 4) debars aliens from exercising the municipal privileges of a burgess.

The statute of 32 Hen. VIII. c. 16, which makes void all leases of dwelling-houses or shops to alien artificers or handicraftsmen, and imposes a penalty of 100*s.* for granting such lease, is still unrepealed. An alien can bring an action or suit in the English courts in respect of personal property or contracts; and he may dispose of his property by testament. The *droit d'aubaine*, or right of succeeding to the effects of a deceased alien, formerly claimed by the crown of France, never prevailed in this country. Nor was it customary to enforce it even in France, except as against the natives of a state in which a similar right was exercised. For some time previous to its abolition by the first constituent assembly in 1791, it was generally stipulated by foreign countries, in their treaties with France, that their subjects should be exempt from the law. [AUBAINE.] This doctrine of reciprocity was adopted by the French code ('Code Civil,' art. 726), but was abrogated in 1819, by a law which gives (art. 1) to foreigners the right of succession, disposition, and receiving, in the same manner that the French enjoy. The second article of the law provides for the case where Frenchmen and foreigners are both claimants. ('Code Civil,' art. 726, par Boileux.) Aliens who are subject to any criminal proceeding in our courts of justice are in most cases entitled to trial by a jury *de medietate linguae*.

The disabilities of an alien may be partially removed by the king's letters patent which constitute him a free denizen. From the date of the grant he is entitled to hold land, and transmit it to his after-born children, and to enjoy many other privileges of a native subject. But the most effectual method of naturalizing an alien is by act of parliament, called a Naturalization Bill, by which he is admitted to every right of a natural-born subject, except the capacity of sitting in parliament or the privy council, or of holding grants and offices of trust under the crown; an exclusion dictated by the jealous policy of the legislature on the accession of the House of Orange. [DENIZEN; NATURALIZATION.]

The rights of aliens belong only to alien *friends*.

In the reign of Charles II. aliens were invited to settle in this country, and to engage in certain trades, by an offer of the privileges of native subjects. (15 Charles II. c. 15.) This statute was repealed by 12 & 13 Wm. III. c. 2; but there is an unrepealed act of 6 Anne which naturalizes all foreigners who shall serve for two years on board any ship of her majesty's navy or a British merchant-ship.

In the early part of the last century (1708) a bill was brought into parliament for the general naturalization of all foreign Protestants, upon their taking certain oaths and receiving the sacrament in any Protestant church, and it passed notwithstanding the strenuous opposition of the city of London, who represented that they would sustain loss by being obliged to remit certain dues which aliens were obliged to pay. After remaining in operation for three years, it was repealed on a suggestion of its injurious effects upon the interests of natural-born subjects; but a previous bill for effecting this object was rejected by the Lords. The reasons for and against the measure are stated in the fourth volume of Chandler's 'Commons' Debates,' p. 119-122. In 1748 and 1751 a measure similar to the act of 1708 was brought forward, and in 1751 it was read a second time, but was dropped in consequence of the death of the Prince of Wales, which disarranged the public business.

The Alien Acts (33 Geo. III. c. 4; 34 Geo. III. c. 43, 67, and others) were passed entirely from political motives, and were mainly enacted on account of the great number of foreigners who came to England in 1792 and 1793. The crown has probably always had the power of banishing aliens from the realm, which these acts expressly gave to it: at all events the power has undoubtedly been often exerted; though not of late years without the sanction of parliament. In 1827 a measure was introduced (7 Geo. IV. c. 54) for the general registration of all aliens who come to this country. This act was repealed by 6 Wm. IV. c. 11, but new provisions of a similar character were introduced. By one clause masters of vessels arriving from foreign parts are to declare what aliens (mariners navigating the vessel excepted) are on board or have landed, under a penalty, for omission or for false declaration, of 20*l.*, and 10*l.* for each alien omitted. Every foreigner on landing is required immediately to exhibit any passport in his possession to the chief officer of customs at the port of debarkation, and to state to him, either verbally or in writing, his name,

birth-place, and the country he has come from, under a penalty, for neglect or refusal, of 2*l*. The officer of customs is to register this declaration, deliver a certificate to the alien, and transmit a copy of the declaration to the secretary of state. On leaving the country the alien is required to transmit to the secretary of state the certificate granted him on landing. The act does not affect foreign ministers or their servants, nor aliens under fourteen years. The proof of non-alienage lies on the person alleged to be an alien.

The registration clause is generally disregarded by foreigners, and is never enforced, for there is no provision in the act for recovering the penalty. There are two alien clerks at the port of London, and one at Dover, but at other ports the business is done by the officers of customs.

Under the act 7 Geo. IV. c. 54, the number of foreigners who arrived and departed during the year was ascertained; but it is said that the papers have been destroyed. The returns under the census of 1841 do not distinguish foreigners from British subjects born in foreign parts. The total number of foreigners and British subjects born abroad resident in Great Britain on the 6th of June, 1841, was 44,780, of whom 33,628 resided in England, and 19,931 of this number were returned in the counties of Middlesex and Surrey. The number of foreigners naturalized does not on an average exceed seven or eight a year, and the number who apply for letters of denization does not exceed twenty-five.

The same classes of persons who are aliens according to the law of England, are aliens according to that of Scotland, and the statute law on the subject extends to that part of the empire. When an alien resident in Scotland wishes to acquire the privileges of a British subject, he must go through the same forms, as above described, as in England. The institutional writers maintain that an alien cannot hold any kind of heritable property in Scotland, but in the books there are only two cases on the subject, and in one the general question was evaded; in the other an alien was found not to have a sufficient title to pursue a reduction of a conveyance of an estate. (Leslie *v.* Forbes, 9th June, 1749, M. 4636.) If the rule that aliens cannot hold heritage were strictly interpreted, it would affect property which all classes of persons are in the practice of holding in Scotland without molestation; but in the general case it would be difficult to find a form in which an alien's title could be brought in question. It is doubtful whether an alien in Scotland who holds the statutory qualification may vote for a member of the House of Commons.

The following are the laws as to aliens in France and the United States of North America, two countries with which Englishmen are more closely connected than any other:—

A child born in France, of foreign parents, may, within one year after he has attained the age of twenty-one, claim to be a Frenchman; if he is not then resident in France, he must declare his intention to reside there, and he must fix his residence there within one year after such declaration. An alien enjoys in France the same civil rights as those which Frenchmen enjoy in the country to which the alien belongs; but he enjoys the right of succession in France, although this right may not be granted to French citizens in his own country. An alien is allowed by the king's permission (ordonnance du roi) to establish his domicile in France; and so long as he continues to reside there, he enjoys all civil but not political rights; but this enjoyment ceases immediately the domicile is lost. After an uninterrupted residence during ten years, by permission of the king an alien may become naturalized. ('Code Civil,' liv. 1, tit. 1, s. 9.) A foreigner can buy and hold land in France without obtaining any permission from the crown or legislature.

Upon the recognition of the independence of the United States of North America by the treaty of Paris, 1783, the natural-born subjects of the King of England who adhered to the United States became aliens in England; and it was decided that they became incapable of inheriting lands in England. It had been previously decided in America that natives of Great Britain were aliens there, and incapable of inheriting lands in the United States. Kent defines an alien to be 'a person born out of the jurisdiction of the United States;' but this definition is not sufficiently strict, for the son of an alien, which son is born in the United States, is also an alien.

Congress has several times altered the law respecting naturalization, but chiefly as to the period of previous residence. In 1790 only two years' residence was required; in 1795 the term was prolonged to five years; and in 1798 to fourteen years. In 1802 the period of five years was again adopted, and no alteration in this respect has taken place. The benefits of naturalization have always been confined to 'free white persons;' persons of mixed blood are excluded, as well as the African and other pure races, whether black or copper-coloured. At what point a person of mixed blood could claim naturalization is doubtful. By an old law of Virginia, which was not repealed up to a recent period, a person with one-fourth of negro blood is deemed a mulatto. An alien in the United States cannot have full and secure enjoyment of freehold of land; and if he dies the inheritance escheats. He can neither vote at elections nor hold public offices. Two years at least before he can obtain the privileges of a natural-born citizen he must appear in one of certain courts, or before certain officers, and declare on oath his intention to become a citizen of the United States, and to renounce his allegiance to his own state or prince. When the two years have expired, and if the country to which the alien belongs is at peace with the United States, he is next required to prove to the court, by his oath as well as otherwise, that he has resided five years at least in the United States, and one year in the state where the court is held; and he must show that he is attached to the principles and constitution of the United States, and is of good moral character. The court then requires that he should take an oath of fidelity to the constitution, and likewise an oath by which he renounces his native allegiance. He must also renounce any

title or order of nobility, if he has any. The children of persons naturalized according to this form, if they were minors at the time, are deemed citizens if they are then dwelling in the United States. If an alien dies in the interval between having taken the preliminary steps towards his naturalization and the time of his admission, his widow and children become citizens. A naturalized alien immediately acquires all the rights of a natural-born citizen, except eligibility to the office of President of the United States and of governor in some of the states. A residence of seven years, after naturalization, is necessary to qualify him to be a member of Congress. (Kent's 'Commentaries,' vol. ii. p. 50-75.)

In 1804 Congress passed an act supplementary to the act of 1802, which contains a clause respecting the children of American citizens born abroad, but it applies only to the children of persons who then were or had been citizens; and Kent remarks ('Commentaries,' vol. ii. p. 53) that the rights of the children of American citizens born abroad are left in a precarious state; and in the lapse of time there will soon be no statute which will be available, in which case the English common law will be the only principle applicable to the subject.

There is a considerable diversity in the laws of different states respecting aliens. By a permanent provision in the state of New York, an alien is enabled to take and hold lands in fee, and to sell, mortgage, and devise (but not to demise and lease the same), provided he has taken an oath that he is a resident of the state, and has taken the preliminary steps towards becoming a citizen of the United States. There are similar provisions in several of the other states. In New York resident aliens holding real property are liable to be enrolled in the militia, but they are not qualified to vote at any election, to be elected to any office, or to serve on a jury.

The condition of aliens in different countries of Europe appears from the evidence given by Harvey Gem, Esq., before the Select Committee on aliens, in 1843, and the information was stated to have been obtained from the ambassadors or ministers of the different powers in London.

ALIMENT, ALIMENTARY ALLOWANCE. [ALIMONY.]

ALIMENTUS, CINCIUS. [CINCIUS ALIMENTUS.]

ALIMONY (from the Latin *alimónium* or *alimonia*, a word which is used by the classical writers, and signifies 'maintenance or support'). If a wife is separated from her husband by a sentence of the ecclesiastical courts, she generally obtains by the sentence an allowance out of her husband's estate, which is called alimony. But if she has a separate and sufficient income beyond the husband's control, the wife is not entitled to alimony. In the ecclesiastical court, the decree for alimony is incidental to a decree of divorce *a mensa et thoro* upon the ground of cruelty or adultery on the part of the husband.

The amount of alimony depends wholly upon the judgment of the court, which is exercised according to the circumstances of each particular case. The station in life of both parties, and the fortune brought by the wife, are considered; and much stress is laid upon the disposal of the children and the expense of educating them. If the wife has eloped from her husband, or where the sentence of divorce proceeds upon the ground of her adultery, the court will not allow alimony. Alimony will be granted during the continuance of a suit, but it is always much less in amount than permanent alimony.

The assignment of alimony during a suit will not discharge the husband from liability for his wife's contracts; but when the court has allotted her a permanent maintenance upon the termination of a suit, the wife is liable for her own contracts, and the husband is wholly discharged from them.

The equivalent in Scottish law to the term alimony is *Aliment* or *Alimentary Allowance*. A wife is entitled to aliment from her husband when she is deserted by him, when she is judicially separated from him, and during the continuance of an action of divorce, whether at his or her own instance. She has no right to aliment in the case of a voluntary contract of separation. It is a general principle of the law of Scotland, that a person who by disease or otherwise is unable to support himself, is entitled to an alimentary allowance from the nearest relation he can prove capable of affording it, but the House of Lords have shown a disposition to restrict the operation of this principle. The father of an illegitimate child is bound to make an alimentary allowance for it, but the amount and the time during which it is to continue depend on his rank and fortune.

ALIQUOT PART. One number or fraction is said to be an aliquot part of a second number or fraction, when the first is contained an exact number of times in the second. Thus, 6, 8, 4, 2, $1\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, &c., are all aliquot parts of 12, being contained in it respectively 2, 4, 3, 6, 8, 28, 96, &c. times. The word is principally used in the arithmetical rule called *practice*, and the convenience of using it is as follows. If we want to know how much $30\frac{1}{2}$ yards cost at 1*l.* 15*s.* 6*d.* a yard, the direct process of common arithmetic would be to turn $30\frac{1}{2}$ yards into half yards, giving 61, and 1*l.* 15*s.* 6*d.* into sixpences, giving 71. Then multiplying 61 by 71, and dividing the product by 2, we have the number of sixpences which $30\frac{1}{2}$ yards cost, which must then be reduced into pounds, shillings, and pence. But if we observe that 1*l.* 15*s.* 6*d.* is made up of 1*l.*, 10*s.* the half of one pound, 5*s.* the half of 10*s.*, and 6*d.* the tenth of 5*s.*, we can proceed as follows:—

	£	s.	d.		£	s.	d.
$30\frac{1}{2}$ yards at	1	0	0	per yard cost	30	10	0
"	0	10	0	"	15	5	0
"	0	5	0	"	7	12	6
"	0	0	6	"	0	15	3
"	1	15	6	"	54	2	9

in which each line is derived from the preceding by simple division, on the obvious principle that at 6*d.* a yard we give the tenth part of what we give at 5*s.* a yard, and so on.

ALISMA'CEÆ, a natural order of plants belonging to the monocotyledonous division of flowering plants.

The order receives its name from the genus Alisma, one species of which, *Alisma plantago*, a common wild plant, in wet ditches and by river sides, has had the reputation of being a cure for hydrophobia. Its powdered root is given in doses of from half a drachm to a drachm, either infused in wine or mixed with syrup.

ALISON, REV. ARCHIBALD, was born in 1757, in Edinburgh, of which city his father, Andrew Alison, was a magistrate. He was educated at the University of Glasgow; and proceeded, with an exhibition, to Balliol College, Oxford. He obtained various preferments in the English church; and in 1800 became senior minister of the episcopal chapel, Cowgate, Edinburgh, and continued to officiate for the congregation, which afterwards removed to York Place, till 1831, when severe illness compelled him to withdraw from the performance of his public duties. He died in 1839, at the age of 82. He was much respected for his private character, was in habits of intercourse with the most distinguished literary men of Edinburgh, and was much admired as a preacher.

His literary reputation chiefly depends on his 'Essays on Taste,' which were first published in 1790, but which made little impression on the public till the second edition, with additions, came out in 1811, when the work became the subject of an encomiastic article by Jeffrey, in the 'Edinburgh Review,' and it then became popular; its popularity, however, has long been on the decline.

ALIZARIN. [MADDER.]

A'LKALI. This word is compounded of the Arabic article *al* and *kali*, the name of the plant by burning which a saline mass is obtained containing the alkali in question; and in this term are comprehended various other bodies possessing similar properties.

The alkalies are numerous, and they are all compound substances; they do not result, however, from the action of any specific or alkalizing principle, being very variously constituted. All exist in nature, and some may be artificially formed. The alkalies may be divided into three classes:—

1st. *Ammonia*, existing in the animal fluids, and composed of two gaseous bodies, viz. hydrogen and azote. As it readily evaporates, it was formerly called the *volatile alkali*.

2nd. *Compounds of certain metals and oxygen*, among which are potash and soda, which, though long known as the *fixed alkalies*, and usually obtained from the ashes of plants, were discovered by Davy to be metallic oxides. This class also comprehends the alkaline oxides or earths, lime, magnesia, &c. No metal yields two alkalies by different degrees of oxidizement; nor does any one become an alkali and an acid.

3rd. The *vegeto-alkalies*, produced in plants during vegetation. They are, as far as has been ascertained, quaternary compounds of oxygen, hydrogen, carbon, and azote. This class includes *quina*, an active medicinal principle of cinchona or bark, and *morphia*, one of the narcotic principles of opium, &c. [ALKALOIDS.]

The chemical and distinguishing properties of the alkalies are, that their aqueous solutions turn vegetable blues green, and vegetable yellows reddish-brown; and hence infusion of red cabbage and infusion of turmeric, or paper stained with them, are used as tests of the presence of an alkali. The alkalies restore the colour of vegetable blues which have been reddened by acids, and, on the other hand, the acids restore vegetable colours which have been altered by the alkalies. The alkalies have great affinity for and readily combine with acids, forming *salts*, and the power of both in altering vegetable colours is generally destroyed. The alkalies are separated at the negative pole of the voltaic trough. In odour, taste, molecular form, and uses in the arts, the alkalies differ considerably.

ALKALIES, *Medical Properties of*. These bodies, with the exception of ammonia, are combinations of oxygen with a metal. They have a great affinity for water, and very readily absorb watery vapour from the atmosphere. Their chief characteristic is the facility with which they unite with acids to form salts. Alkalies, strictly speaking, are only three in number, viz. soda, potassa, and ammonia. These are termed *inorganic*, to distinguish them from the organic substances, which are more properly called ALKALOIDS, or Organic Alkalies. Strontian and barytes have sometimes been deemed alkalies, as well as magnesia and lime; these last are frequently termed alkaline earths. The alkalies are possessed of the alkaline attributes in the highest degree, are very acrid and caustic, readily soluble in water and alcohol, and form with carbonic acid salts very soluble in water: the alkaline earths are less caustic, sparingly soluble in water and alcohol, and form, with one proportion of carbonic acid, salts which are almost insoluble in water; but when carbonic acid is present in excess, the base is nearly completely dissolved, a circumstance which explains their presence in many mineral waters when they first issue from the spring, but from which they are precipitated on exposure to the air.

It is impossible to exclude magnesia and lime from consideration when treating of alkalies, but the remarks which follow are chiefly intended to apply to soda, potassa, and ammonia. The salts formed with alkalies are apt to *effloresce*, and resolve the crystals into the state of powder, or to absorb water from the air, and *deliquesce*, or become liquid.

Alkalies in a pure state are extremely caustic, destroying the tissues with which they come in contact, and forming an escar which is deep if the alkali be confined, extensive and superficial if allowed to spread. This seems to depend on their strong affinity for water: hence they act as violent corrosive poisons, and are never used in a pure state, save in surgery, to open abscesses or to form caustic issues. Diluted with oils they constitute rubefacients, particularly ammonia. Their causticity is also greatly lessened by combination with carbonic acid, and is more subdued by an excess of the acid; hence bi-carbonates are less

caustic than sesqui-carbonates, and these last than carbonates. The carbonic acid is apt to fly off on exposure to the air, so that they regain their causticity. Carbonate of ammonia will altogether disappear if not kept in a well-stopped bottle; this tendency is one source of its utility when used as smelling salts.

Ammonia and its carbonates are likewise pungent. They exercise an immediate influence on the fluids of the mouth and alimentary canal, as far as they pass unchanged. That they neutralize all acids they meet with in their course, and render the mucus, and perhaps some other secretions, thinner and more watery; that they are readily absorbed into the circulating mass, on which they have a marked influence, is certain; but they are for the most part speedily eliminated, the kidneys appearing to be the channels by which they are thrown out of the system. Many alkaline compounds, as well as the uncombined but diluted alkalies, increase the secretion of urine, and change its nature if long persevered in, altering it from an acid to an alkaline state. The alkalies possess a power of rendering albumen soluble: unboiled white of egg is an albuminate of soda. The albumen of the blood is rendered more fluid by alkalies; hence in excess they impair the plastic power of that fluid. When alkalies are taken unnecessarily or persevered in too long, much evil is done: not only is an alkaline state of urine induced, with a deposition of the phosphates, as indicated by a white sabulous sediment, or an iridescent pellicle on the surface of the urine, but much general debility is caused.

ALKALOIDS, substances which modern chemistry has discovered, are termed sometimes *vegetable alkalies*, as hitherto found only in vegetables, and sometimes *organic alkalies*, from requiring a vital power to effect their formation; but the name given to them above is the most appropriate. They possess alkaline properties in the lowest degree, and are either tasteless or have a bitter acrid taste, existing generally in a solid, mostly crystalline form; some, however, are amorphous (Aconitinæ), occasionally in a liquid state (Conia and Nicotina), the latter very volatile, and readily undergoing decomposition, with an evolution of ammonia, at a moderate temperature. The point in which they differ most from the common alkalies (except Ammonia) is in having nitrogen in their composition, one of them (Caffeina) being perhaps the most highly nitrogenized compound known. Sometimes one only exists in a plant, sometimes several in the same plant, as in opium. Generally they are combined with an acid; most frequently it is a peculiar acid. Many of them are with difficulty soluble in water, more so in alcohol; they rarely completely neutralize acids, but the salts which they form are more soluble than the bases; hence various of their salts are used in medicine in preference to the primitive article.

ALKANET. [ANCHUSA.]

ALKMAAR, is a strongly fortified and well-built town in North Holland, on the Helder canal, 20 English miles N.N.W. of Amsterdam, in 52° 38′ N. lat., 4° 43′ E. long. It is intersected by broad canals, and has exceedingly pleasant environs of excellent gardens and rich meadows. This town is the greatest cheese depôt in Holland, and also a great butter market. It has some fabrics of sail-cloth, and a population of about 9000.

ALKMAAR, HENRY OF, or HINREK VON ALKMER. [REINEKE FUCHS.]

ALL-HALLOWS, ALL-HALLOWMAS, or simply HALLOWMAS, the old English name for All Saints' Day, or the 1st of November.

All-Hallowmas derives its importance from the popular usages, which in our own and various other countries have distinguished sometimes the day itself, but more generally the night preceding, called its eve or vigil. There is reason to believe that this was a Pagan before it was transformed into a Christian festival; and there can, at any rate, be no question that the ceremonies to which we refer are of Druidical origin. Bonfires, bell-ringings, and domestic merry-makings, in which lamb's wool (ale or wine mixed with the pulp of roasted apples) was the principal beverage, marked the eve of Hallowmas. The season called for such demonstrations. The harvest was over; the winter was at hand.

But the eve of All-Hallows is especially famous for those observances which have been wont to take place on it, connected with the superstitious wish of prying into futurity. The same ceremonies of this description appear to have been anciently practised in England, Ireland, and Scotland; but they are now almost universally disused. The well-known poem of Burns, the 'Halloween,' will immortalize the memory of the ancient ceremonies to which it relates.

ALL SAINTS' BAY (*Bahia de Todos os Santos*), a large and commodious bay in Brazil, the entrance to which is in 12° 42′ S. lat., and 38° 42′ W. long.; it is eight miles wide between the points of Tagapipe and Saint Antonio, thirty-seven miles long from north to south, and twenty-seven miles wide in the widest part from east to west, within which space it is computed that secure anchorage could be found for all the navies of the world. The bay contains several fertile islands; the largest of these, called Itaparica, stretches inwards from the mouth of the bay, which it divides so as to form two entrances. This island is eighteen miles long, and about six broad in the widest parts: the coasts of the bay have many small inlets.

ALL SAINTS' DAY. [ALL-HALLOWS.]

ALL SAINTS' ISLANDS, a cluster of three small islands near the south side of the Island of Guadaloupe, in 15° 51′ N. lat., and 61° 44′ W. long. The two largest islands of this cluster are called Terre-d'en-Haut, or High Island, and Terre-d'en-Bas, or Low Island. The inhabitants of these islands, who are not more than 300 in number, are very poor, and subsist principally on vegetables and fish.

ALL SOULS' COLLEGE, Oxford, was founded in 1437, by Henry Chichele, Archbishop of Canterbury, to be called 'The College of the Souls of all the Faithful Deceased,' *Collegium omnium Animarum fidelium defunctorum de Oxon.* The most remarkable clause in the charter gave the

society leave to purchase lands to the yearly value of 300*l.*, a sum of great magnitude for the time, and which has since been increased to 1050*l.* yearly value.

The statutes for the regulation of the college were modelled after the statutes which had been given to New College, by William de Wykeham; and ordained that the fellows shall be born in wedlock in the province of Canterbury, with a preference to the next of kin descended from Robert and William Chichele, the founder's brothers.

In 1442, the college was capable of receiving the warden and fellows; but it was not finished till the latter end of 1444. The society now consists of a warden, forty fellows, two chaplains, and seven clerks.

Of the original buildings, as left by the founder, very little now remains. The principal front, towards the High Street, till within a few years retained somewhat more of its ancient character than at present. The great quadrangle was erected by Hawksmoor soon after the beginning of the last century.

ALLA, in music, has the power of the phrase 'in the manner of,' as *Alla Capella*, in the manner of chapel or church music: *Alla Francese*, in the French style.

ALLA-BREVE, in music, a quick time, in which the notes take only half their usual length. This is synonymous with the old *Tempo di Capella*, or time of church music; but is now rarely used.

ALLAH is the Arabic name of the Supreme Being, which through the Koran has found its way into the languages of all nations who have embraced the Mohammedan religion. It is properly a contraction of *al-ilâh: al* is the Arabic article 'the,' and *ilâh* signifies a deity generally: the prefixed article restricts the meaning, and *al-ilâh* or *Allah* signifies the true God, as opposed to the deities worshipped by idolaters.

ALLAHABAD, a province of Hindustan, lying between 24° and 26° N. lat., is bounded on the N. by Oude and Agra; on the E. by Bahar; on the S. by Gundwana; and on the W. by Malwa. The length of the province from E. to W. is 270 miles, and the average breadth from N. to S. about 120 miles. It is a part of the British territory, and is now included in the North-Western Provinces.

Allahabad is one of the most populous and productive provinces in the Indian empire. It furnishes indigo, cotton, sugar, opium, diamonds, and saltpetre. The greatest proportion of the population are Hindus, only about one-eighth part professing the religion of Mohammed.

The principal rivers of the province are the Ganges, the Jumna, the Goomty, and the Caramnassa, with their branches. The streams are all in the northern part of the province; the country in their vicinity is generally flat and fertile, and the climate is hot, but wholesome. To the south-west the country is hilly. In this quarter, in the district of Bundelcund, the diamond mines of Panna are situated.

(Rennell's *Memoir of a Map of Hindostan*; Hamilton's *East India Gazetteer*.)

ALLAHABAD, the capital of the province of Allahabad in Hindustan, is situated in 25° 23′ N. lat., 81° 50′ E. long., at the junction of the rivers Ganges and Jumna. An extensive fortification is erected on the tongue of land where these streams unite, so as completely to command the navigation. This fort is built of freestone with circular bastions, in which the cannon are mounted on the sides next to the rivers; the land side is a perfectly regular fortification of great strength.

Allahabad was a favourite residence of the Emperor Akbar, who may be said to have been the founder of the modern city, and of its fortifications. In 1765 the fort was taken by Sir Robert Fletcher, but was afterwards restored to the Nabob of Oude, and again was transferred to the East India Company in 1803. Allahabad stands in an extremely favourable situation, on a dry and healthy soil; it has easy communication with Calcutta and Bombay, and is the seat of British military, civil, and judicial establishments; yet it is greatly reduced in size, and is in a ruinous state, compared with its condition under the Mohammedan emperors. The population is about 40,000, of whom about 27,000 are Hindus, and 13,000 Mohammedans. The only considerable buildings, besides the fort, are, the Jumna Musjeed, or principal mosque, which is in good repair but little frequented, and Sultan Khosroo's serai and garden. The serai is a large quadrangle with four fine gothic gateways, and surrounded by cloisters for the accommodation of travellers. In the garden are some Mohammedan tombs, beautifully constructed, and ornamented with sculpture. Allahabad is resorted to by large numbers of Hindu pilgrims, for the purpose of bathing in the place where the two sacred rivers make their junction. Allahabad is 460 miles W.N.W. from Calcutta, and 260 E.S.E. from Agra, measured in a straight line.

(Heber's *Narrative of a Journey to the Upper Provinces of India in* 1824 *and* 1825; Hamilton's *East India Gazetteer*.)

ALLAN, DAVID, called the Scottish Hogarth, was born in 1744, at Allon, in Clackmannanshire, where his father was shore-master. The choice of his profession was partly owing to an accident; he burnt his foot, and while he was being nursed at home, having nothing else to do, he amused himself with drawing with a piece of chalk upon the floor, an amusement he got so much attached to, that when he recovered he had a very great objection to going to school. But he soon obtained a happy release from this obligation, for his old schoolmaster turned him away from the school, for making a caricature of him punishing a refractory boy. The caricature seems to have had merit, and Mr. Stuart, collector of the customs at Allon, was so much struck with it, that he recommended Allan's father to send him to the academy of Robert and Andrew Foulis, at Glasgow, to learn to become a painter. He was accordingly apprenticed in 1755, his eleventh year, to Robert Foulis, to learn drawing, painting, and engraving. Allan remained at this academy nine years, and when he returned home he had the good fortune to be patronized by the resident families of Cath-

cart, Erskine of Mar, and Abercromby, by whom he was generously sent as a pensioner to prosecute his studies at Rome. At Rome he was introduced to Gavin Hamilton, who was of great assistance to him in his professional pursuits. Allan proved himself worthy of the generous patronage he enjoyed: he raised hopes, however, while at Rome, which he never realized afterwards. He obtained first a silver medal for a drawing in the Academy of St. Luke, and afterwards the gold medal for painting. He painted other pictures at Rome; and he made also four humorous designs illustrating the Roman Carnival, which through Paul Sandby's prints of them became very popular. But he no more deserved the title of the 'Scottish Hogarth,' which for these and a few other similar designs he obtained in Scotland, than his historical pictures would warrant his being called the Scottish Raphael.

In 1777 Allan visited London, which, however, he left for Edinburgh, after practising there for a short time as a portrait painter. After the death of Runciman, in 1786, Allan succeeded him as master of the Trustees' Academy, which office he held for ten years, until his death in 1796. Allan's most popular designs are his Twelve Illustrations of Ramsay's 'Gentle Shepherd,' which he engraved himself in aquatinta.

(Cunningham, *Lives of British Painters*, &c.)

ALLANTOIN, ALLANTOIC ACID. This substance exists in the allantoic liquid of cows, and has since been obtained by Liebig and Wöhler artificially by treating uric acid with binoxide of lead. It has the form of brilliant colourless crystals derived from the rhomboid, with a vitreous appearance. It is insipid, does not act upon vegetable colours, dissolves in 160 parts of cold water, and in much less when boiling. It is soluble in nitric acid, and decomposes by boiling in it without evolving nitric oxide. Its formula is $C^4 H^3 N^2 O^3$. [Atomic Theory.]

ALLA'TIUS, LEO, a Greek, who was born in the Island of Chios, in 1586. Being carried over to Italy at an early age, he was taken under the protection of a powerful family in Calabria, and educated in the Greek college at Rome. Early in life he revisited his native country; but he soon returned to Rome, where he was finally appointed librarian to the Vatican. During his long life, he edited manuscripts, translated Greek authors, and published many original works, which display more learning and industry than taste or judgment. He was one of the most strenuous and bigoted upholders of the Roman Church and of papal infallibility. (See his treatise 'De Ecclesiæ Occidentalis et Orientalis perpetua Consensione.') He founded a college in the Isle of Chios, and died at Rome in the year 1669, aged 83.

ALLEGATION, ECCLESIASTICAL, is the term applied to the first plea in testamentary causes: in criminal proceedings (ecclesiastical) the first plea is called Articles; in plenary or ordinary causes the first plea is called the Libel. This first plea is analogous to a declaration at common law, or to a bill in equity. The term Allegation is also applied to every subsequent plea, in all causes. The first plea given in by a defendant is called a Responsive Allegation; the plaintiff's answer to that is called a Counter Allegation. The pleadings are not usually carried beyond this step. Besides these allegations, either party in the case is allowed to except to the credit of any witness upon matter contained in his deposition. These exceptive allegations, when admitted, are proceeded upon in the same manner as other pleas. (Phillimore's ed. of Burn's *Eccl. Law*.)

ALLEGHANY MOUNTAINS. [Appalachian Mountains.]

ALLEGHANY, River. [Mississippi, River.]

ALLEGIANCE, or LIGEANCE, is thus defined by Coke:—'*Ligeance, à ligando*, is the highest and greatest obligation of duty and obedience that can be. Ligeance is the true and faithful obedience of a liegeman or subject to his liege lord or sovereign. 'Ligeantia est vinculum fidei: ligeantia est legis essentia.' The notion of ligeance, or allegiance, is that of a bond or tie between the person who owes it and the person to whom it is due. (Co. Lit. 129 a.). Allegiance is due from those who are natural-born subjects, and also from denizens and those who have been naturalized. A natural-born subject is called a natural liegeman, and the king is called his natural liege lord.

The allegiance of a subject is permanent, and he cannot by any act of his own relieve himself from it. An alien owes allegiance while he is within the dominions of the king; and he may be prosecuted and punished for treason.

By the old oath of allegiance the party promised 'to be true and faithful to the king and his heirs, and truth and faith to bear of life and limb and terrene honour, and not to know or hear of any ill or damage intended him without defending him therefrom.' The modern oath enforced by statute since the Revolution, is this: 'I do sincerely promise and swear that I will be faithful and bear true allegiance to her majesty Queen Victoria.'

The alteration of the form has not changed the subject's duty, which is owing from him antecedently to any oath, and although he may never have been called upon to take it. The king can, by proclamation, summon his liegemen to return to the kingdom, an instance of which occurred in 1807, when the King of England declared, by proclamation, that the kingdom was menaced and endangered, and he recalled from foreign service all seamen and seafaring men who were natural-born subjects, and ordered them to withdraw themselves and return home, on pain of being proceeded against for a contempt. It was further declared that no foreign letters of naturalization could, in any manner, divest his natural-born subjects of their allegiance, or alter their duty to their lawful king.

By the old law, every male subject of the age of twelve years (with certain exceptions) was bound to take the oath of allegiance when summoned to the courts called Leets and Tourns; and various statutes, from the reign of Queen Elizabeth to the present century, have required it from public functionaries and other persons before they enter upon their respective duties, or practise in

their several professions. By 1 George I. c. 13, two justices of the peace, or other commissioners appointed by the king, may tender the oath to any person who is suspected of disaffection.

A violation of allegiance is high treason.

If a foreigner is naturalized here, he owes allegiance to the British crown. But if, as is nearly always the case, he still continues to owe allegiance to his former state or sovereign, his new allegiance may, under certain circumstances, as for instance in time of war, place him in a difficult situation.

ALLEGORY, literally a discourse which has another meaning than what is directly expressed. Thus, the address of Menenius Agrippa to his fellow-citizens of Rome, as recorded by Livy (ii. 32), in which he described a rebellion of the industrious against the wealthier orders of a state, under the figure of a conspiracy of all the other members of the human body against the stomach, was an allegory. The poets of different nations have resorted to this method, in order to convey sufficiently vivid conceptions of the different virtues and vices, and other abstractions. They have personified these notions, as it is termed. Such pictures are allegories, and are to be found abundantly scattered over nearly all poetry.

Of all poets who have dealt in allegories of this description, our own Spenser is the most famous and the greatest; no other has either produced so vast a number of these vivified idealities, or put into them such a spirit of life and air of actual existence.

ALLEGRE'TTO, in music, a slower measure than *allégro*, but moderately gay.

ALLE'GRI, ANTONIO. [Correggio.]

ALLE'GRO, in music, an Italian adjective, signifying *gay, sportive*, and, by inference, quick in time. An allegro is not understood to be so fast in vocal as in instrumental music. Its quickness is likewise modified by the number and value of the notes in a bar; so that other words are usually added to it, to explain the composer's intention more clearly.

Some of its compounds are—*Allegro Agitáto*, in a hurried manner; *Allegro Assai*, very quick; *Allegro Brillánte*, quick and brilliantly; *Allegro Giusto*, quick, but *just, precise; Allegro Moderáto*, moderately quick; *Allegro di Molto* (*di molto*, much), very quick; *Più Allegro*, quicker, *more* quick; *Poco Allegro*, rather (*a little*) quick.

ALLELUIA. [Hallelujah.]

ALLEMANDE, in music, a dance supposed to have been so called from the French name of the country, Germany, in which, according to the prevailing opinion, it originated. It is written in two-crotchet time, and is now understood to be moderately quick, the word *Allegretto* best indicating its movement; but formerly it was played in slower time.

ALLEN, or ALIN, or ALYN, a river which rises in Denbighshire, and flows through Flintshire, where it has a subterraneous passage for about a mile; it emerges a little above the town of Mold, and ultimately falls into the Dee.

ALLEN, JOHN, M.D., a writer on subjects connected with metaphysics, history, and physiology, was born in January, 1770, at Retford, in the parish of Colinton, near Edinburgh. He studied at Edinburgh, where he took a degree in medicine in 1791. He soon afterwards connected himself with those movements in Scotland for the furtherance of parliamentary reform, which called down the vengeance of the government. In 1795 he published 'Illustrations of Mr. Hume's Essay concerning Liberty and Necessity.' In 1801 he translated from Cuvier, 'An Introduction to the Study of the Animal Economy.' It appears to have been about the commencement of this century that he formed an intimacy with Lord Holland, with whom he continued to reside until that nobleman's death. He became an extensive contributor to the 'Edinburgh Review,' on subjects chiefly connected with the British constitution, and with French and Spanish history. Forty-one articles in that periodical are attributed to him, and his researches in a great measure serve to establish and characterize its opinions on constitutional questions. In 1830 he published a small but valuable constitutional work, called an 'Inquiry into the Rise and Growth of the Royal Prerogative in England.' He died April 3, 1843.

ALLEN, WILLIAM, was born in 1770. His father was a silk manufacturer in Spitalfields, and a member of the Society of Friends. Having shown a predilection for chemical pursuits, he was placed in the establishment of Mr. Joseph Gurney Bevan, in Plough Court, Lombard Street, London, where he acquired a practical knowledge of chemistry. He eventually succeeded to the business, which he carried on in connection with Mr. Luke Howard, and acquired great reputation as a pharmaceutical chemist. About the year 1804 Mr. Allen was appointed lecturer at Guy's Hospital on chemistry and experimental philosophy, and he did not wholly retire from this institution until 1827. He was elected a Fellow of the Royal Society in 1807, and the 'Philosophical Transactions' contain accounts of several of his chemical investigations. Mr. Allen was mainly instrumental in establishing the Pharmaceutical Society, and he was the president of this institution at the time of his death. Many years before his death, Mr. Allen purchased an estate near Lindfield, Sussex, and withdrew from business. Here, while still zealously engaging in public schemes of usefulness and benevolence, he carried out various philanthropic plans of his own. He erected commodious cottages on his property, to each of which an ample allotment of land was attached. He was anxious to make provision for the education of the young. In 1825 he established day-schools at Lindfield, and in 1834 a department was added for boarders. The school-buildings and premises comprised a building for twenty boarders, school-rooms for boys and girls, an infant-school, workshops, outhouses, playgrounds; and there were about three acres of land cultivated on the most approved system by the boarders, who also took a part in household work. There was a good library, with various scientific and useful apparatus. Mr. Allen himself delivered lectures periodically to the boys on subjects connected with their probable future avo-

cations. He died at his house near Lindfield, December 30, 1843. (*Pharmaceutical Journal and Transactions* for February, 1844; *Minutes of Committee of Privy Council*, 1842-3, 'Lindfield School,' p. 551.)

ALLENDALE. [NORTHUMBERLAND.]

ALLERTON, NORTH. [NORTHALLERTON.]

ALLEYN, EDWARD, was born Sept. 1, 1566, in the parish of St. Botolph without Bishopsgate, London. His father, Edward Alleyn, was a citizen and innholder in that parish. Mrs. Alleyn married a second time. Her husband, whose name was Brown, is described as a haberdasher, but he was also an actor; and thus Fuller was no doubt correct when he states that Edward Alleyn was bred a stage-player. Born only two years later than his great contemporary, Shakspere, and labouring in the same vocation with him for nearly thirty years, the career of Alleyn must offer many parallel circumstances with the career of Shakspere; and it thus acquires a secondary interest of no inconsiderable value. In 1592 he married Joan Woodward, the daughter of Agnes Woodward, a widow, who, previous to this period, had become the wife of Philip Henslowe, one of the principal theatrical managers of that day. Alleyn and Henslowe now entered into partnership in their stage concerns. The theatre which he and Henslowe owned from the period of his marriage was the Rose on the Bankside; but in 1600 they built a new theatre, the Fortune, in Cripplegate, near Red Cross Street. The inhabitants of the neighbourhood petitioned the Privy Council to sanction this theatre, and the parochial favour seems to have been very skilfully acquired. The householders approved the scheme 'because the erectors of the said house are contented to give a very liberal portion of money weekly towards the relief of our poor,' and 'because our parish is not able to relieve them.' But Alleyn and his father-in-law had other sources of profit: they were the owners of the dogs and bears which were exhibited at Paris Garden, and in time Henslowe and Alleyn became patentees of the office of 'the mastership of his Majesty's games of bears, bulls, and dogs.' After the accession of James, Alleyn's company became 'the prince's players,' as Shakspere's was the king's; and having purchased the patent office of master of the king's games, Henslowe and Alleyn, in 1606, rebuilt Paris Garden for those disgusting exhibitions in which the court and the populace equally delighted. The patentees had the right of sending bear-wards into the country; and accounts at Dulwich exhibit the expense and profits of such exhibitions. Thus accumulating property in various ways, Alleyn was so thriving a man in 1606 as to have purchased the manor of Dulwich from Sir Francis Calton.

Alleyn commenced the building of Dulwich College in 1613. Previous to this he appears to have discontinued appearing on the stage as an actor. Alleyn, having considerable riches, and no family, had, before he resolved upon the particular appropriation of his wealth, not only acquired a reputation for benevolence, but intimated an intention to make an endowment for some charitable institution. In 1616 he had nearly completed his establishment at Dulwich. There were legal difficulties in the establishment of 'God's-gift College' as a foundation; and no less a person than the Chancellor Bacon thought it his duty to resist the completion of Alleyn's wishes. The opposition of the chancellor was however overruled, and Alleyn was allowed to dispose of his munificent endowment of eight hundred pounds a year according to his own wishes. The college was for the support and maintenance of one master, one warden, and four fellows, three of whom were to be ecclesiastics, and the other a skilful organist; also six poor men, six women, and twelve boys to be educated in good literature. The patent passed the great seal on the 21st of June, 1619; and on the 13th of the following September Alleyn formally and publicly dispossessed himself of this, the greater part of his property, and thenceforward he and his wife lived in this foundation upon a footing of equality with those whom they had raised into comfort and comparative opulence. Alleyn appears to have had a full and earnest enjoyment in his rare munificence. He had property enough left to bestow on other charitable objects. In 1620 we find him founding almshouses in Finsbury. His diary gives us a curious picture of his habits after his retirement to Dulwich. His wife Joan died in 1623. He was very soon married again, to a lady whose Christian name was Constance, and who is supposed to have been a daughter of the celebrated Dr. Donne. Alleyn lived with his second wife only about two years. His will, dated November 13, 1626, states that he was sick in body; and on the 25th of the same month he died, and was buried in the chapel of his college, called Christ Chapel, in a plain manner, according to his special direction.

The founder of Dulwich College had a singular partiality for persons bearing his own name. Howes, the continuator of Stow's 'Chronicle,' mentions, about 1614, that Alleyn was building his college, and that he intended the master always to be of the name of Allen or Alleyn. This limitation continues to exist. Dulwich College now possesses very large revenues; and the situation of master especially is one of great value. Alleyn left a collection of pictures there, to which additions were gradually made; but in 1810 Sir Francis Bourgeois bequeathed to the college his valuable collection, which he had previously offered, but without success, to the government, upon the condition of building a gallery for its reception. This collection is easily accessible to the public, without fee.

The papers at Dulwich College, whether in the writing of Alleyn or his partner Henslowe, throw some light upon the literary history of the drama. Alleyn appears to have been a man of a kindly heart towards those with whom he was brought in contact; and all these documents show that the theatrical writers—men who have earned their immortality—were for the most part poor and wretched. The writers for the theatre were almost innumerable; and excellence up to a cer-

tain point was very generally attainable by them. Perhaps some of the higher excellence of Shakspere may be attributable to the fact that he was at ease in pecuniary matters; that almost alone he could produce the most attractive novelties for his own theatres; that he was not dependent upon managerial caprice; that in fact he was making a fortune, as Alleyn himself was making it, by his property, in a species of enterprize which had universal supporters, and which, in his case, had the especial support of the wealthiest and best educated of the community.

(Fuller, *Worthies of England;* Kippis, *Biographia Britannica;* Collier, *Memoirs of Alleyn*, published by the Shakespeare Society; Malone, *Historical Account of the English Stage.*)

ALLGEMEINE ZEITUNG (i. e., *Universal Gazette*) is the name of one of the principal German newspapers. The plan for this publication was conceived in 1794, by the well-known bookseller, J. G. Cotta, of Tübingen. Owing to certain difficulties arising from the censorship in the Würtemberg dominions, Augsburg was ultimately chosen for its publication, where it still experiences much liberality on the part of the Bavarian government. In English and French newspapers it is often called the 'Augsburg Gazette.'

ALLIANCE, HOLY. [Alexander, Emperor of Russia.]

ALLIANCE, TRIPLE. [Triple Alliance.]

ALLIER, River. [Allier, Department.]

ALLIER, a department of France formed out of the province of Bourbonnais, is bounded N. by the departments of Nièvre and Cher, E. by those of Saône et Loire and Loire, S. by that of Puy de Dôme, and W. by those of Creuse and Cher. The department, which lies between 45° 58′ and 46° 47′ N. lat., and between 2° 24′ and 3° 57′ E. long., measures 84 miles from E. to W. and 55 from N. to S.: it contains 2790 square miles; the population in 1841 was 311,361, which gives an average of 111.6 to the square mile, or 56.4 below the average per square mile for all France.

The department is a vast plain, with an inclination from S. to N.W., diversified by some gentle undulations, and in the S. by two ranges of hills which respectively lie between the Bebre and the Allier, and the Allier and the Cher. The surface, for the most part, consists of a primitive soil, resting on granite, or in the south on limestone; but in the centre the soil is alluvial. Coal, iron, and antimony are found; granite, marble, and limestone are quarried; mineral springs are found at several places, but those of Vichy, Neris, and Bourbon-l'-Archambault are most frequented. The ponds and rivers of the department abound in excellent fish, which are sent to the Paris markets. There are extensive forests, which supply oak for ship-building.

The principal river of the department is the Allier, which rises in the north-east of the department of Lozère; after leaving which it flows through those of Haute Loire, Puy de Dôme, Allier, and Cher, passing the towns of Brioude, Issoire, Vichy, and Moulins, and falls into the Loire about four miles below Nevers, having run from N. to S. a course of 220 miles, of which 88 miles from St. Arcons in Haute Loire to Mariol in Allier, are available for floating timber; and 79 miles, from Mariol to the Cher, are navigable. Its principal affluents are the Dore on the right, and the Sioule, which receives the Bouble, on the left. The south-east of the department is drained by the Bebre, which rises in the department of Loire, and enters the river Loire a little below Dompierre, after a course of 47 miles almost entirely within the department. The Loire and the canal along its banks lie on the E. of the department, the Cher crosses it in the W., as does also the Berry canal, which commences at the coal-mines of Commentry, passes Montluçon, and runs parallel to the Cher as far as St. Amand, in the department of Cher.

Of the whole area of the department (1,789,063 acres) 72,840 are covered with forests. The quality of the land is in general good, especially along the courses of the Allier and the Sioule: corn is grown in great quantity; oxen and sheep are fatted on the rich pasture lands for the supply of Paris and L ; the veal of the environs of Montluçon is highly esteemed. The bulk of the population is employed in agriculture; but the quarries and mines of the department, as well as its manufactures of cutlery, hats, linen, serge, carpets, porcelain, and glass, give employment to a considerable number. The chief trade of the department is in provisions, cattle, iron, wood, and coal.

The department is divided into four arrondissements, which, with the number of cantons, communes, and population in each, are as follows:—

Arrond.	Cantons.	Communes.	Pop. in 1841.
Moulins . . .	9	98	90,323
Gannat . . .	5	79	66,323
La Palisse . .	6	77	74,920
Montluçon . .	6	96	79,795
Total. . .	26	350	311,361

In the arrondissement of Moulins the chief town is Moulins, which is also the capital of the department. It stands on the right bank of the Allier, which is here crossed by a stone bridge with thirteen arches, at a distance of 156 miles by the road S.S.E. from Paris, in 46° 34′ N. lat., 3° 20′ E. long. It is a clean well-built town of modern construction; the squares are adorned with fountains, and streams of water run through the streets. The chief buildings are the Hotel de Ville, the Palais de Justice, both of which are modern, and the Church of the Convent of Visitation, which contains the tomb of Henri de Montmorency, who was beheaded under Louis XIII. at Toulouse; the convent itself is now occupied as a college. The town is the seat of a bishop, has tribunals of first instance and of commerce, a school of design, agricultural and scientific societies, and a public library containing 18,000 volumes. It was formerly the centre of the cutlery trade, which is now much decayed; the chief business of the town is in coal, iron, and wood. The population is 15,400. The other towns are —Bourbon-l'-Archambault, much frequented from

May to October on account of its mineral waters: Dompierre, on the Bebre: Lurey-Levy, where superior porcelain and pottery are made; it also trades in wood, corn, fish, coal, and cattle: Montet-aux-Moines, near which is a good coal-mine at Tronget, which is joined to the Allier by a railroad: Neuilly-le-Real: and Souvigny, which has the finest gothic church in the department.

In the arrondissement of Gannat the chief town is Gannat, which has a population of 5000, a tribunal of first instance, and an hospital; near the town there are mineral springs which give out carbonic acid gas during the months of May and June. The other towns are—Chantelle-le-Château, where are the vast ruins of King Pepin's castle: Ebreuil, Escurolles, and St. Pourçain, all on the left bank of the Sioule, in a rich wine district.

In the arrondissement of La Palisse, the chief town is La Palisse, on the Bebre; population 2270. The other towns are—Cusset, which has a tribunal of first instance, and trades in corn, cattle, hemp,-and wine; population 4120. Vichy, on the right bank of the Allier, famous for its hot springs, which were known to the Romans, and which are visited in the season from May to October by the most distinguished society of France: Jolligny, on the Bebre, near which marble and potters' clay are found: Varennes: and Le Donjon.

In the arrondisssement of Montluçon the chief town is Montluçon, on the right bank of the Cher, which is crossed here by a fine stone bridge. It is an old town surrounded by walls flanked with four round towers, which separate the town from the faubourgs. It has a tribunal of first instance, a college, and an hospital, and manufactures coarse woollens, household linens, and paper. In the neighbourhood of Montluçon are the great iron-works of Tronçais, in the forest of Tronçais. The other towns are—Herisson, the walls and castle of which are in ruins: Marcillat, near which is a coal-mine: Montmarault, in which cables and cutlery are made, and which trades in corn, fruit, and cheese: Neris, situated at the end of the Berry canal, and famous for its hot springs, which were known to the Romans, who have left here an encampment and an amphitheatre, which is now laid out in beautiful terrace walks; the place is much frequented from the end of May till the middle of October: and Commentry, a large village, important on account of its iron-works, coal-mine, and plate-glass factory, which gives employment to about 800 workmen.

The department returns four members to the Chamber of Deputies, forms the diocèse of Moulins, is comprised in the jurisdiction of the Cour Royal of Riom, and of the University Academy of Clermont, and is included in the nineteenth military division, which has its head-quarters at Clermont.

(*Géographie Universelle;* Balbi, *Géographie.*)

ALLIGATION, derived from the Latin *ad* and *ligare*, signifying to bind together, or unite. It is a rule in arithmetic, by which the price of a mixture is found when the price of the ingredients is known.

ALLIGATOR, a word of uncertain origin, but now adopted by naturalists as the generic term of a group of crocodiles peculiar to the New World. (See Dumeril et Bibron, 'Erpétologie Générale,' vol. iii. p. 63.) The crocodiles are fierce carnivorous aquatic reptiles, of large size, constituting the first family of the *Sauria* in Cuvier's arrangement. They are covered above with a coat of mail, consisting of bony plates of moderate size embedded as it were in the skin, and covered externally with a hard coriaceous cuticle: these bones are generally furnished with a ridge or crest, which adds to their strength, and they form altogether an admirable panoply of defence. The tail is long, thick, muscular, compressed, and ridged above. The limbs are short. The anterior feet have five toes, of which the two outermost are destitute of a nail. The hinder feet have each four toes more or less united by intervening webs. The head is flat above, furrowed and rugged. The jaws are enormous, and armed with numerous teeth in a single row; these are of unequal length, conical, and hollow at the base, the cavity of each receiving the germ of the tooth destined to replace it. The teeth are separated from each other, the intervals mutually receiving the teeth of the opposite jaw, when the jaws are closed. The auditory orifice is protected by a strong moveable valve, capable of being raised or shut down at pleasure. The eyes are small but bright, with a vertical linear pupil; they are protected by eyelids and a membrana nictitans. The nostrils are valvular, and seated close together on the extremity of the muzzle; the nasal passages do not open into the mouth, but into a post-oral space, divided from the mouth by a valvular cartilaginous expansion of the *os hyoides*, which is so accurately adjusted to a depending portion of the palate, as to bound the back of the mouth; hence, if the nostrils be raised above the water, these animals may keep the mouth open below, or hold their prey while it is drowned, themselves breathing all the time at ease. In the act of swallowing, the valve is drawn down by the action of the muscles of deglutition, so as to leave a passage free, through which the food is propelled in large masses. The space between the two branches of the lower jaw is muscular, and covered internally with a yellow skin full of glands, whence oozes a viscid saliva. This glandular skin represents the tongue. Beneath the throat are two large musk-glands, whence exudes a strong musky humour. The vertebræ of the neck are furnished with short false ribs which overlap each other, and render a lateral movement difficult; hence these reptiles cannot turn abruptly as they pursue their prey on land, and are therefore the more readily avoided. The abdomen is protected and supported by an arrangement of bones termed abdominal ribs. The crocodiles are the only saurian reptiles destitute of clavicles, but the coracoid processes of the scapulæ are attached to the sternum. These large reptiles swim by lashing the tail from side to side, and often as they urge their way leave a hoary track behind them. When surprised on land they always make at once for the water; for it is there only that they can effectually exert their formidable strength. On the land they are

awkward, turn, as we have said, with difficulty, and are by no means swift, so that a man may easily outstrip them. When, however, they are intercepted, they defend themselves with fury, snapping violently, and striking from right to left with their tail, a single blow of which will level the most powerful man; hence they are not to be dispatched without difficulty and danger. They are often captured by means of baited hooks, or sharp-pointed pieces of wood, and by harpoons, and are dragged by main force on shore, there to be destroyed. Musket-balls can only penetrate the eyes or the flanks, and then do not necessarily kill the animal, which instantly plunges, and remains at the bottom of the water.

In the stomach of these reptiles it is very common to find stones of various sizes, which have been swallowed, as some suppose, to form a sort of ballast, but most probably, as the stomach in its structure and form bears a close resemblance to that of a fowl, in order to bruise down the food, and thus assist in the process of digestion.

The eggs of these reptiles equal those of a goose or of a swan in size, and are covered with a parchment-like membrane. The females of some species watch their eggs, deposited in the sand, and conduct the young to the water. Both eggs and young are liable to great destruction from beasts and birds of prey. The alligators, caïmans, or caymans, are distinguished from the true crocodiles, by having the head very broad, the muzzle depressed and obtuse; the teeth are unequal, and the fourth on each side from the front of the lower jaw is elongated, and received into a cavity of the upper jaw when the mouth is closed, and not as in the crocodiles into a notch. The hinder limbs are destitute of the ridge of acute scales down the hinder margin so conspicuous in the true crocodiles, and the webs between the toes are much less developed.

The alligators like the crocodiles are oviparous, and bury their eggs in the sandy or muddy earth of the banks of rivers, leaving them to be hatched by the natural heat of the sun. These fierce reptiles haunt the more tranquil parts of rivers, creeks, and lakes; and in some remote districts abound in great numbers; they may be seen basking in the sun on the banks, or in the water, their large flat heads protruding through the leaves of aquatic plants, which spread around in luxuriance. It is during the night principally that they are active in the pursuit of prey, chasing fishes, or seizing on whatever animal comes within their way: while driving the shoals before them they often utter loud bellowings which may be heard at a considerable distance. These savage and powerful animals seldom attack men except in defence of their eggs or young, yet there are not wanting instances in which persons bathing or swimming across rivers have fallen victims to their ferocity, and dogs and pigs are very frequently snapped up. If their prey be too large to swallow at a single mouthful, they bury it beneath the bank of the river till it easily falls asunder from putrescence.

The species are distinguished among other points by the differences in the arrangement of the cervical osseous plates, which, however, is subject to certain variations even in the same species.

M. Bibron enumerates five distinct species, besides some varieties. The species are—1. *Alligator palpebrósus;* this species has the eyelids osseous; it is a native of Cayenne, Surinam, Guiana, Brazil: 2. *Alligator lucius*, found in the Mississippi, in the rivers of Louisiana, Florida, Georgia, Carolina, Savannah, &c. It hybernates during the cold season, burying itself under the mud at the bottom of swamps and marshes, and becomes so completely torpid, that it may be cut to pieces without exhibiting signs of animation; 3. *Alligator sclerops*, a native of Guiana, Brazil, &c. (Yacaré of Azara); 4. *Alligator cynocéphalus*, a native of Guiana, Brazil, &c.; 5. *Alligator punctulátus*, Martinique, and also Brazil.

The *alligator trigonátus* of Schneider is a variety of *A. palpebrosus.* (Bibron, vol. iii. p. 74.) A specimen in the Paris museum which was erroneously labelled 'du Niger' has led to some confusion respecting it.

Of the above species the *A. lucius*, or Pike-nosed Caïman is the largest, attaining to the length of 14 or 15 feet, and appears to exceed the others in ferocity. It is said to prefer the flesh of the negro to all other food, probably because the slave is more exposed to attacks than his master. It is gregarious in its habits, numbers uniting in chase of fishes, which they catch by diving under the shoal; having secured one they rise to the surface, throw it into the air, and catch it in its descent, instantly gorging it, a plan by which the necessity of swallowing water with it is avoided. The voice resembles the bellowing of a bull.

For details respecting the alligators, see Azara, and the narratives of Prince Maximilian, Spix, Von Martius, and other travellers in Central and South America.

ALLIGHUR, a strong fortress of Hindustan, in the province of Agra, 54 miles N. from the city of Agra, is situated in 27° 58′ N. lat., 78° 8′ E. long. It is connected with the town of Coel, about two miles S., by a road bordered with trees and forming a fine avenue.

ALLITERATION, a term usually employed to signify the frequent recurrence in composition of words commencing with the same letter, when introduced with a view to its rhetorical effect. Byron's line in the concluding stanza of the second canto of 'Childe Harold,'

'O'er *h*earts divided, and o'er *h*opes destroyed,'

may be given as an example. Churchill has at once ridiculed and exemplified the figure in his well-known verse,

'And apt alliteration's artful aid,'

where every word begins with the same letter. Modern critics have detected numerous instances of alliteration both in the Latin and Greek poets. (See the dialogue entitled 'Actius,' in the 'Latin Dialogues' of Joannes Jovianus Pontanus; and Harris's 'Philological Enquiries,' Part II., chap. iv.) Alliteration, however, has been most systematically used as an ornament of diction in the Celtic and Gothic dialects. Dr. Percy, in an

essay published in his 'Reliques of Ancient English Poetry,' has traced the origin and history of alliterative verse down from the compositions of the old Icelandic poets. The remains which we possess of Saxon poetry exhibit frequent instances of lines constructed apparently upon the principle of alliteration; but it certainly was not so systematically adhered to in that language as in the compositions of the Icelandic bards.

The most celebrated poem in the English language, entirely composed in alliterative metre, is that entitled 'The Visions of Pierse Plowman,' written about the middle of the fourteenth century, and attributed to William or Robert Longland, a secular priest, and a fellow of Oriel College, Oxford. This is a long work, consisting of twenty-one parts or books, and composed throughout in verses the cadence of which appears to be generally anapæstic, but which are evidently designed to derive their chief metrical beauty from a certain artificial disposition, in each, of the words beginning with the same letter. The poem has been frequently printed; but the last and best edition is that published by the late Rev. Thomas Dunham Whitaker.

Our popular ballad and lyrical poetry is full of such lines as those with which the Scotch song commences:—

> 'Merry may the maid be
> That marries the miller;
> For foul day and fair day,' &c.

Down even to the present day, the use of alliteration, to a considerable extent, has continued to characterise English versification in its most polished form, and in the hands of some of our greatest poets.

ALLIUM, a very extensive genus of plants, belonging to the natural order *Asphodèleæ*. The species are all remarkable for having, in a greater or less degree, the odour of garlic, and for the agreeable stimulating effects that accompany it.

Allium cepa, the common onion, is too well known to require description. It is not certain of what country it is a native; but it has from time immemorial been cultivated in Egypt. Its varieties are not very numerous, considering that it is almost exclusively increased by seed: the most remarkable are the blood red, which is the most pungent; the Strassburg, which is the hardiest; the silver-skinned, which is the smallest, and the most fitted for pickling; and the Portugal and Tripoli, which are the largest and the most delicate. In this country the bulbs do not generally arrive at the large size of those imported from Portugal and Spain; but skilful gardeners have nevertheless succeeded in procuring them fully as fine.

Allium schœnoprasum, the chive, is a little tufted plant, the leaves of which are the part eaten, and they are cropped as occasion requires.

Allium fistulosum, the Welsh onion, is a native of Siberia, and is cultivated chiefly for the purpose of being sold in the markets when very young, at which time its flavour is delicate; its hardiness enables it when young to brave our spring cold better than the common onion.

Allium ascalonicum, the shallot, a native of Asia Minor, is in many respects similar to the chive, from which it is known by its larger leaves, its smaller and more deeply-coloured flowers, and by its stamens having alternately three points on the filaments. Two very distinct varieties of this useful plant are known, one of which is much larger and more delicate than the other. To obtain the bulbs in the greatest perfection they should not be buried in the earth, as is the common practice, but merely placed on the surface of the soil.

Allium sativum, garlic, has been found wild in Sicily, and some parts of Provence.

Allium ophioscórodon, rocambole, or Spanish shallot, is very slightly different from garlic. It is a native of most parts of the south of Europe; it is little cultivated in this country.

Allium porrum, the leek, has, like many other cultivated plants, disappeared in a wild state, so that its origin is unknown.

As the sensible properties of the whole genus are evidently much the same as those of the common onion, differing chiefly in degree of concentration or diffusion, the chemical analysis of the bulbs of this species may be considered illustrative of that of all the rest. MM. Fourcroy and Vauquelin found that the common onion is composed, 1, of a white, acrid, volatile oil, holding in solution sulphur which renders it fetid; 2, of a vegeto-animal matter analogous to gluten; 3, of a good deal of uncrystallizable sugar; 4, of a great quantity of mucilage, resembling gum Arabic; 5, of phosphoric acid, either free or combined with lime, acetic acid, and a little citrate of lime; and 6, of vegetable fibre. It is to the volatile oil that the irritating properties of the onion are supposed to be owing, and they are consequently dissipated by heat.

ALLOA, a sea-port town, in the county of Clackmannan, on the north bank of the Forth, 27 miles N.W. of Edinburgh, in 56° 7′ N. lat., 3° 46′ W. long. The population in 1841 was 5434. The town is ancient, and the old part is irregularly built, with narrow streets, but in the modern part there are some spacious streets, with handsome houses and good shops. The new church, opened in 1819, is an elegant structure in the Gothic style, and has a spire 207 feet high. There are three meeting-houses of presbyterian dissenters, an independent meeting-house, and an episcopal chapel. The town has three banks, an assembly-room, in which the public courts of the county are held, and several select subscription libraries, consisting chiefly of religious books, ten schools, one of which is a grammar school, two public reading rooms, a mechanics' institute, a Shakspere club, and several benefit societies.

The town contains three large distilleries, five breweries, where ale is made which has long been in high repute, and five woollen manufactories, glass-works, corn and flour mills, gas works, and a great iron-foundry, chiefly for the making of steam-engines. Bricks, tiles, and other earthenware, copper goods (especially distillers' apparatus), leather, tobacco, and snuff, are also extensively manufactured. The salmon fishery is carried on with considerable spirit. Alloa possesses a com-

modious harbour, with a depth of water of 16 feet at neap-tides, and from 22 to 24 feet at spring tides. Its vessels sail to every quarter of the globe; and their burthen was registered in December, 1845, at 18,364 tons. The coasting trade is also very extensive. The number of vessels entered inwards in Dec. 1845 was 127, and the number cleared outwards 997. There were, at the same date, four steam-vessels belonging to the port, of upwards of 50 tons burthen. The imports consist of corn, wool, wine, tea, timber, hemp, oak bark, &c.; the exports are coals, and the many industrial products of the town and neighbourhood. Alloa is supplied with water conveyed in pipes from Gartmorn Dam, which covers an area of 160 acres, and is fed from the Black Devon river. The stream which issues from this dam, besides supplying the town, turns several mills, and serves for cleansing the harbour. The work was constructed by the Earl of Mar in the beginning of the 18th century.

ALLO'DIUM, or ALO'DIUM, is property held in absolute dominion, without rendering any service, fealty, or other consideration whatsoever to a superior. It is opposed to Feodum or Fief [FEUDAL SYSTEM], which means property the use of which was bestowed by the proprietor upon another, on condition that the person to whom the gift was made should perform certain services to the giver, upon failure of which, or upon the determination of the period to which the gift was confined, the property reverted to the original possessor. Hence arose the mutual relation of lord and vassal.

It is the general opinion that the lands which the Germanic tribes, Franks, Burgundians, and Visigoths, seized during the decline of the Roman empire, were distributed among the members of these tribes in some way, and held free from all service or duty. Land so held was called Allod, or Alod, and in the Latinized form, Allodium. The system of fiefs, or the feudal system, as it is called, was posterior to that of this allodial holding of lands; and it was not completely established, at least in France, till towards the end of the tenth century.

In England there is no allodial land, for all land is held mediately or immediately of the king. The name for the most absolute dominion over property of this nature is a fee (feodum), or an estate in fee, a word which implies a feudal relation. When a man possessed of an estate in fee dies without heirs, and without having devised his property, the estate escheats, or falls back to the lord of whom it was holden: or, where there is no intermediate lord, to the king as lord paramount.

The Latinized forms of this word are various:—alodis, alodus, alodium, alaudum, and others. The French forms are—aleu, aleu franc, or frank aleu, franc-alond, franc aloy, and franc-aleuf. In many old charters alodum is explained by hereditas, or heritable estate. But it is very difficult to collect any theory from the numerous passages in which the word occurs which shall satisfactorily explain its etymology. (Du Cange, 'Gloss.' Alodis; Spelman, 'Glossarium.')

There is a very elaborate article on allodial land in the 'Staats-Lexicon' of Rotteck and Welcker, under the head 'Alodium;' and there are some remarks by Guizot, 'Histoire de la Civilization en France,' vol. iii.

ALLOPHANE occurs reniform, botryoidal, globular, and massive. No cleavage. Colour blue, green, brown. Fracture conchoidal. Hardness 3.0 nearly. Lustre vitreous; transparent, translucent. Specific gravity 1.852 to 1.859. Found at Saalfeld in Thuringia, at Schneeberg in Saxony, and other places. Analysis, by Stromeyer:—Silica, 21.922; alumina, 32.202; lime, 0.730; sulphate of lime, 0.517; carbonate of copper, 3.058; hydrate of iron, 2.270; water, 41.301.

ALLO'RI, the name of two distinguished Italian painters, father and son, though different in style.

The father, Alessandro Allori, was born at Florence in 1535, and was brought up by his uncle, Angelo Bronzino, likewise a very distinguished painter. From his connection with his uncle he was frequently called Bronzino. He was one of the most distinguished painters of the anatomical school, and was a devoted admirer of Michael Angelo. He died in 1607. Allori's works, both in oil and fresco, are numerous, and many on a large scale.

The son, Cristofano Allori, born at Florence in 1577, was a better painter than his father. He studied with Gregorio Pagani, and rivalled that painter in richness of colour, and surpassed him in delicacy of execution. But he was idle and fastidious, and his works are scarce. In execution he was equal to anything, and he had of course a corresponding skill in copying. He died in 1621.

(Baldinucci, *Notizie de' Professori del Disegno*, &c.; Lanzi, *Storia Pittorica*, &c.)

ALLOTMENT SYSTEM. From the Anglo-Saxon period to the reign of Henry VII., nearly the entire population of England derived their subsistence immediately from the land. The great landowner consumed the produce of his demesne, which was cultivated partly by prædial slaves and by the labour of the tenants and cottiers attached to the manor. These tenants were the occupiers of small farms, and paid their rent in kind or in services, or in both. The cottagers had each a small croft or parcel of land attached to his dwelling, and the right of turning out a cow or pigs, or a few sheep, into the woods, commons, and wastes of the manor. While working upon the lord's demesne they generally received their food. The consolidation of small farms in the sixteenth century, and the altered social state of the country which took place at that period from a variety of causes, dissevered to a great extent the labouring classes from the soil which they cultivated. They had previously produced for their own consumption, and as domestic manufactures were common, each household possessed within itself the means of satisfying its principal wants. They now began more generally to work for money wages; and in vain did the legislature attempt

to preserve them from dependence on this source of subsistence, by enacting penalties against building any cottage 'without laying four acres of land thereto.' (31 Eliz. c. 7.) There were still, however, large tracts of waste and common lands on which the cottager could turn a cow, a pig, a few sheep, or geese, and this right still gave him a portion of subsistence directly from the land. The division and inclosure of these commons and wastes completed the process by which the labourer was thrown for his sole dependence on money wages.

So long as the labourer is paid fair wages, he can obtain the chief necessaries of life; yet it happens that in most parts of the country he would be unable to procure any other description of vegetables, except potatoes, unless he had a garden attached to his cottage. No agricultural labourer's cottage should be without a garden where it is practicable. The necessity for cultivating the land on his own account, further than for the purpose of raising sufficient vegetables for his own consumption, and of looking to the allotment system as a means of remedying the evil of low wages and insufficient employment, is, in proportion to its urgency, an indication of the low position of the agricultural labourer. If he has sunk to this inferior state, and there are no other means of increasing his resources, the allotment system is then an expedient deserving of attention, and at the present time great expectations are entertained of what it is capable of doing for the labourer; but it should be understood that, in an economical sense, it is a more satisfactory state of things when the improvement in the condition of the labourer arises from the prosperity of the farmer, and his ability to give higher wages. The allotment system, if carried to considerable extent, involves the question of the advantage of very small farms as compared with large ones; a question that cannot be discussed satisfactorily without a consideration of the general economic condition of each particular country. But it may be laid down as a sure principle, that in a country where a large part of the population are employed in other pursuits than those of agriculture, the necessary supply of food and other agricultural produce, for those who are not agriculturists, cannot be raised so profitably in any way as by the well-instructed farmer, who has a sufficient capital to cultivate a large farm; and if the whole country were divided into small farms, the necessary supply of produce for the wants of the non-agriculturists would ultimately fail altogether.

The possession of such a quantity of land as is beyond what a labourer can cultivate easily at his leisure hours, or with the assistance of his family, may be for a time a specious benefit, but in the end will be an injury to himself and to others.

The legislature has in several instances sanctioned the plan of allotting land to the poor, for cultivation, in some cases for the paupers of the parish only, and in others for the independent cottager. The plan might be carried further under due regulation. The slight increase which a small piece of land affords to the means of the agricultural labourer, the moral advantages which it produces in keeping him above parochial relief, and giving him an object for the exercise of sobriety and industry, cannot be doubted. It is one of the means open to a judicious benevolence to mitigate the inequalities of modern society, and has been extensively acted upon by individuals and associations. The principal rules which experience has shown to be best calculated to render the allotment system successful, are the following:—as it is not intended that the tenant should look upon his plot of ground as a substitute for wages, but merely as a small addition to this main resource, its size should not be greater than can be cultivated during the leisure or spare time of the labourer or his family. The size of the allotment is determined by the number of the tenant's family, or the quality of the land, and in some cases by the quantity of manure which can be collected. The maximum size of allotments, according to Captain Scobell, should not exceed 50 or 60 rods, and 20 rods are sufficient for a person just settled and without a family. The size of Mrs. Davies Gilbert's allotments in Sussex are as follows:—255 less than a quarter of an acre; 108 quarter acres; two contain 60 rods each; 13 are half acres; two are three-quarter acres; 22 are one-acres; 16 others contain two, four, and five acres; and one is of nine acres. Some persons state that a man in full employ can manage an allotment of a quarter of an acre, or 40 rods; but others are of opinion that 20 rods are quite enough. The allotment should be situated as near as possible to the tenant's cottage; should never exceed a mile, as the labourer will be fatigued by a longer walk, and it will be inconvenient to send so far for vegetables for daily use; and in fact, this distance is far too great. In Kent there are allotments which are two or three miles from the labourer's dwelling, but this is a proof that employment is precarious, and that on the whole his condition is not good. A much higher rent can be obtained for small allotments under garden tillage, than for land in undivided tenancy. Those who are conversant with the system say that if the rent is one-third higher, the difference is not unreasonable. A form of agreement, which is usually signed by allotment tenants, embodies rules for the management of the land, and fixes other conditions for their observance. Spade-culture is insisted upon, and the use of the plough is prohibited; also underletting and working on Sunday. The allotment is usually forfeited for non-payment of rent, gross misconduct, commitment for any crime, or wilful neglect of the land.

ALLOWANCE, in commerce, a deduction from the gross weight of goods, agreed on between merchants, according to the customs of particular countries and ports, the chief of which is known by the name of TARE.

ALLOXAN, a crystalline body obtained by the action of nitric acid on uric acid. The crystals have the form of an octohedron with a rhombic base, and they are colourless, transparent, very brilliant, often an inch in diameter; they are very efflorescent, and lose 25 per cent. = 6 equivalents of water. When a hot saturated solution of alloxan is made to crystallize, anhydrous alloxan

is obtained in oblique rhombic prisms. Alloxan is very soluble in water; it possesses a disagreeable smell, and a somewhat astringent saline taste. It reddens vegetable colours, and renders the epidermis purple. Its formula is $C^8 H^4 N^2 O^{10}$.

ALLOXANIC ACID. This is produced by the action of the alkalies upon alloxan. It neutralizes bases perfectly, and decomposes the carbonates; when neutralized by ammonia it gives a white precipitate in solution of silver, which becomes yellow by ebullition, and afterwards black with effervescence. It dissolves zinc with the evolution of hydrogen gas. Its formula is $C^4 H NO^4$.

ALLOXANTIN, a crystalline substance, obtained either from uric acid or from alloxan. The crystals are colourless, and in the form of oblique four-sided prisms; they become red when exposed in the air to ammonia; and they are hard and fragile. Alloxantin is slightly soluble in cold water, but more soluble in hot; the solution reddens litmus-paper; when heated in a solution of chlorine, it is converted into alloxan; and the alkalies decompose it. Its formula is $C^8 O^{10} H^5 N^2$.

ALLOY. This word is employed to designate either a natural or artificial compound of two or more metals, except when mercury is one of them, in which case the mixture is called an *amalgam*. Native or natural alloys, considered as such, are not useful bodies; the only exception, if indeed it may be so reckoned, is the alloy of iron and nickel, constituting *meteoric iron*, of which the knives of the Esquimaux appear to be made; but artificial alloys are of the highest importance, since by uniting different metals compounds are formed which possess a combination of qualities not occurring in any one metal. Gold, silver, tin, antimony, and bismuth are generally alloyed; the first three on account of their softness, and the two latter because they are extremely brittle. Gold and silver are hardened by alloying with copper; copper is hardened by zinc, &c.

The formation of alloys appears to depend upon the chemical affinity of the metals for each other; and in some instances it seems to be wanting, for no combination occurs: thus, according to Gellert, bismuth and zinc do not combine. Various facts may be assigned for supposing the combination to be the result of chemical affinity. M. Boussingault analysed six different native alloys of gold and silver, and found in all cases that the metals were combined in definite proportions. The change of properties which metals undergo by combining, furnishes strong evidence of its arising from chemical affinity and action; thus, with respect to colour, copper, a reddish metal, by union with zinc, which is a white one, gives the well-known yellow alloy, brass: the fusing point of a mixed metal is never the mean of the temperature at which its constituents melt; and it is generally lower than that of the most fusible metal of the alloy.

All alloys formed of brittle metals are brittle; those made with ductile metals are in some cases ductile, in others brittle; when the proportions are nearly equal, there are as many alloys which are brittle as ductile; but when one of the metals is in excess, they are most commonly ductile. In combining ductile and brittle metals, the compounds are brittle, if the brittle metal exceed, or nearly equal, the proportion of the ductile one; but when the ductile metal greatly exceeds the brittle one, the alloys are usually ductile. The density of alloys sometimes exceeds, and in other cases is less than, that which would result from calculation.

Not only are the properties of metals altered by combination, but different proportions of the same metals produce very different alloys. Thus, by combining ninety parts of copper with ten parts of tin, an alloy is obtained of greater density than the mean of the metals, and it is also harder and more fusible than the copper; it is slightly malleable when slowly cooled, but on the contrary, when heated to redness, and plunged into cold water, it is very malleable: this compound is known by the name of *bronze*. If eighty parts of copper be combined with twenty parts of tin, the compound is the extremely sonorous one called *bell-metal*; an alloy consisting of two-thirds copper and one-third tin, is susceptible of a very fine polish, and is used as *speculum metal*.

It is curious to observe in these alloys, that in bronze the density and hardness of the denser and harder metal are increased by combining with a lighter and softer one; while, as might be expected, the fusibility of the more refractory metal is increased by uniting with a more fusible one. In bell-metal, the copper becomes more sonorous by combination with a metal which is less so: these changes are clear indications of chemical action.

ALLSPICE. [EUGENIA.]

ALLSTON, WASHINGTON, a distinguished American historical and landscape painter, was born in South Carolina, in 1779, and was educated at Harvard College, which he entered in 1796. Having determined to follow painting as a profession, he resolved to visit England for that purpose; he accordingly set out in 1801, for London, and entered the Royal Academy as a student, in which he remained three years, during the presidency of West. In 1804 he went with a friend to Paris, and thence to Rome, where he remained four years. In 1805 he attracted considerable notice there by a picture of 'Jacob's Vision.' He excelled chiefly in colouring. In 1809 Allston returned to America, and at Boston married the sister of Dr. Channing. In 1811 he again visited England, where he obtained the 200 guineas prize from the British Institution, for a picture of 'The Dead Man raised by Elisha's Bones.' In 1817 he paid a second visit to Paris, with Leslie the Academician; and he returned in the following year to America, to Cambridge in Massachusetts, where he resided until his death in July, 1843. He was an Associate of the Royal Academy of London; his election took place in 1819. In 1830 he married his second wife, who survives him.

ALLU'VIUM, or ALLUVIAL DEPOSITS, a name given to those accumulations of sand, earth, and loose stones or gravel brought down by rivers,

which, when spread out to any extent, form what is called *alluvial land*.

There are three successive stages in the formation of alluvium: viz. the crumbling of the mineral crust of the earth, by the action of tides, currents, streams, and atmospheric agency; the transportation of the loosened fragments; and their deposition in the form of alluvium at the bottom of rivers, lakes, æstuaries, and the ocean.

The mineral substances of most rocks have a tendency to combine with the oxygen of the atmosphere, under particular conditions of heat, moisture, and electricity; carbonic acid and water are absorbed by many rocks; vicissitudes of temperature tend to expand, contract, split, and disintegrate rocks; lightning often shivers a rock into innumerable fragments; every shower of hail or rain washes off fragments more or less numerous from the surface of rocks; so that by these combined agencies of air, moisture, carbonic acid, heat, electricity, hail, and rain, there is a constant wearing away of the substance of solid rocks. It is true that these agencies work very slowly, when the bulk of the rock is considered; but as time, in geological phenomena, is reckoned by ages or centuries instead of by years, this slowness does not throw any improbability over the alleged action of meteoric forces on solid rock.

Another kind of agency is the power of a running stream to wear away the banks and rocks against which it rubs. The force of water, when directed against any obstacle in its course, is very considerable, even by its own weight alone, especially if it be flowing over a highly-inclined surface; but its destructive power is greatly augmented if it be loaded with sand and gravel. In floods, very considerable blocks are carried by the stream to great distances, for it must be remembered that these are much more easily moved in water than on land, in consequence of the law in hydrostatics, that a solid body fully immersed in water weighs so much less than it does in air by a sum equal to the weight of the mass of water which it displaces. If the water flows with a velocity of three inches per second, its force, when free from suspended matter, is sufficient to tear up fine clay; six inches per second, fine sand; twelve inches per second, fine gravel: and three feet per second, will tear up beds of loose stones of the size of an egg. Instances have been recorded in most countries of masses of stone, weighing from a hundred to a thousand pounds each, having been transported many miles by the force of a current.

The formation of *valleys* by the erosive power of running water is another cause of the accumulation of alluvium. The explanation of this subject more fittingly belongs to another article [VALLEYS]; but it may here be observed that there is abundant proof of the power of water to cut a passage through solid rock. In Sicily, the river Simeto has cut a passage for itself through a bed of very hard rock, fifty feet deep, and several hundred feet wide. The river Nerbudda in India has worn away a rock to the depth of 100 feet. Among the Alps, gorges have been scooped out to the depth of 600 or 700 feet, by the action of

running water alone. Such facts as these are sufficient to show that a rapidly-flowing river exerts a powerful disintegrating force.

The wearing and transporting powers of rivers depend upon the volume of water, the quantity and size of the solid matter suspended, and the velocity with which it moves. A river generally runs with greatest rapidity in the higher parts of its course, where indeed it often consists of a succession of torrents and cataracts for many miles, but it has not yet acquired its full destructive force, because the mass of water is still comparatively small, nor has it yet become loaded with solid matter. In the lower part of its course, long before it joins the sea, it has usually reached a level country, and there its velocity becomes greatly retarded. The loss of destructive power, by diminished velocity in the level country, is sometimes compensated, in a considerable degree, by the effects produced by the weight of the great volume of water impinging upon certain parts.

The tortuous courses of rivers when they are cut through solid rock, as in the case of the Moselle, whose banks are sometimes 600 feet high, are among the strongest proofs of the destructive power of running water; for no sudden deluge, however powerful, could have scooped out such a trough; and that a cleft of such a nature should be occasioned by any disruption of the earth's crust, is not less improbable. More sudden, and therefore more striking, instances of the waste of the land occur where a river flows through a lake, and by its wasting action causes a breaking down of the barrier.

The distance to which the detached fragments are carried depends upon the volume of water, and the nature of the ground over which it flows. The torrents from the south-western Alps, rushing over a steep uninterrupted slope, transport large blocks to the sea; but a river that runs through a long stretch of level country deposits the grosser matter in the upper part of its course, and carries to its mouth only that which is more easily held in suspension. The larger stones, after being detached from their parent rock, have therefore to undergo an intermediate process of abrasion, by being rubbed against each other in the bed of the stream before their particles are finally committed to the deep. If a river pass through a lake in its course, the solid matter will be deposited in that trough until it has filled it up; and if the lake be very large, even the lighter particles will have time to fall, and the water will flow out clear from the other extremity. Such processes are now going on, by the gradual filling up of the Lake of Geneva by the Rhone, of the Lake of Constance by the Rhine, of the Lake of Wallerstadt by the Linth, and of many other lakes which have rivers flowing through them. In other cases, the bed of the river itself is gradually being raised by the deposition of this alluvium, and the river is often turned out of its course. This process has gone on at such a rate in Lombardy, that the inhabitants are obliged to make artificial banks to confine the river Po within its proper limits.

In a mountainous country where the land rises

rapidly from the shore, the rivers descending over a steep bed sweep all the contents into the sea. If the neighbouring sea be deep, and the tides be strong, an æstuary or inlet is formed at the mouth of the river—that is, the sea forms a deep indentation into the land, of a triangular shape. If, on the other hand, a low shelving shore, and the absence of strong tidal-currents, favour the gradual and tranquil deposit of the solid matter brought down by the river, an extensive level of alluvial land is formed. In this case the main river, at a distant point inland, often divides itself into two streams, which, gradually diverging until they reach the sea, inclose a triangular space of land having the form of the fourth letter of the Greek alphabet, Δ, and hence called a *delta*. The mass of water does not, however, long continue divided into two streams only, the process of separation is repeated several times, and thus the delta is traversed by several channels, and the great river empties itself into the sea by many mouths. Such a delta is formed at the mouths of the Nile, Ganges, Rhine, Rhone, Po, Danube, Wolga, Indus, Orinoco, and many other rivers. Great as is the amount of new land thus formed, it is but insignificant in comparison with the quantity of solid matter carried down by rivers and deposited in the depths of the sea. The quantity of mud and sand poured by the Ganges into the Bay of Bengal is so great, in the flood season, that the sea recovers its transparency only at the distance of sixty miles from the coast. Mr. Lyell shows that supposing the water to contain one hundredth part of solid matter, a mass equal in bulk to the greatest of the Pyramids of Egypt is brought down by the Ganges every day. If a current runs across the mouth of such a river, it gives rise to the formation of a sand-bank, and greatly accelerates the accumulation of the delta.

Such, then, are the numerous modes in which alluvium is formed, and fitted to become the basis of a rich vegetable soil, by converting into dry land tracts which were before covered with water.

Besides this erosive action of rivers, there is an enormous power due to the sea itself. An extensive waste of the land is in constant progress along every line of coast which presents an abrupt face to the sea. The amount and rapidity of that waste depend upon a variety of circumstances; the nature of the rocks of which the cliffs are composed, according as they are capable of long resistance, or are easily acted upon by the weather and the sea; the force of the tides and currents; the greater or less frequency of storms;—all these accelerate or retard the destructive force of the ocean. In this case also, as well as in the action of running water on the land, the force is greatly augmented when the water is charged with solid matter. The violent surge of a tempest dashing against a cliff, detaches large blocks, and sweeps them away; but the next returning wave hurls them back again against the cliff, and thus a powerful artillery is supplied by the land for its own destruction. The east and south coasts of Great Britain, the Shetland and Orkney Islands, the shores of Denmark, and many other sea coasts of Europe, show evident signs of the power of the sea to encroach upon and wash away the cliffs; thereby adding to the quantity of alluvium brought down by the rivers.

The instances of this destructive power are numerous, and are made evident by the circumstance that buildings which once stood far inland are now close to the cliffs, the sea having gradually washed away the intervening rock. At Shorringham on the Norfolk coast, at Reculver in Kent, and at many other places, this is observable. Geologists are of opinion that England once formed a part of France; the cliffs on the opposite sides of the Channel are identical at the Straits of Dover; and between Folkestone and Boulogne a submarine chain of hills is in some places only fourteen feet below the surface at low water. From the German Ocean to the Straits the water becomes gradually more shallow, diminishing in a distance of 200 leagues from 120 to 18 fathoms; and in the same manner from the Straits to the mouth of the English Channel there is a gradual increase of the depth of the water, so that at the Strait there is a ridge with a fall to the west and to the east. In the wearing of the sides, and consequent widening of the straits, which is now going on, we see only an advanced stage of a work of destruction which has been many thousand years in operation. That Sicily was at one time united to Italy, Ceylon to Hindostan, and the West India Islands to the continent of America, are in like manner deemed very probable hypotheses, the destructive power having in each case been the same, viz. the sea.

ALMACANTER, an Arabic term, now disused, for a small circle parallel to the horizon; so that two stars which have the same almacanter have the same altitude.

ALMADEN, Sisapóna Cétobrix of the Romans (Pliny, 'Nat. Hist.' xxxiii. 7), a town of Spain, in the province of La Mancha, in 38° 41′ N. lat., 4° 49′ W. long., about 130 miles S. by W. from Madrid, is situated upon a hill of cinnabar, between two mountains, which form a part of the chain of Sierra Morena. It comprehends in its district six villages, and has a parish church, an hospital, and barracks for the galley slaves.

Almaden is famed for its mines of quicksilver, which have been known for more than 2000 years. The hill in which the mines are found is 120 feet high; and the cinnabar (ore of mercury) is met with in different parts of the mass. It does not appear that this district is so unhealthy as the quicksilver mines of Idria; for a miner sleeps with safety upon a vein of cinnabar. The galley-slaves, who work in these mines, are not exposed to the hardships that are commonly believed. They only work three hours a day, and do nothing but take out the earth in wheelbarrows. Some feign convulsions, and others fits, to excite the compassion of those who visit the mines. The inhabitants of Almaden work willingly double the time, and receive only half of what every slave costs the government.

The cinnabar occurs in veins which traverse the hill; and pure mercury is also found in crevices of sandstone and slate. For roasting the

ore, ovens and other apparatus are provided; the ovens are twelve in number, and are called by the names of the twelve apostles. Each is capable of containing ten tons' weight of stone. The oven is kept burning for three days, and the same time is required to cool.

The celebrated German merchants, Mark and Christopher Fugger, leased the mines in the seventeenth century; but they were afterwards worked by the Spanish government.

ALMAGEST. [SYNTAXIS.]

ALMA'GRO, a town of Spain in La Mancha, 10 miles E.S.E. from Ciudad-Real. It is situated in a fertile plain, and the district in which it stands is celebrated for its mules, which are considered among the best in Spain.

ALMA'GRO, DIE'GO DE, one of the adventurers who went from Spain to the conquest of America. He was a foundling, but nothing farther is said of him by the historians previous to the year 1525, when he joined with Pizarro, and a clergyman named Hernando de Luque, at Panamá, to undertake the conquest of Peru. Pizarro took the command of the troops; Almagro engaged to procure the supplies of men, arms, and provisions; and Luque was to remain at Panamá to forward the interests of the company. Pizarro set out first, and Almagro afterwards joined him. Some time after the execution or murder of the Peruvian Atahualpa, Francisco Pizarro was informed of the arrival of Pedro de Alvarado with some troops to undertake the conquest of Peru, and sent Almagro to them to ascertain their intentions. Almagro met them on the coast, near the present port of Callao. After some negotiation, the greater part of the troops of Alvarado, tempted with the offer of 100,000 gold crowns to be divided among them, joined their fellow-countrymen and marched together to Cuzco.

Almagro was informed by one of this party that he had been appointed governor of Nueva Toledo. From this time arose disputes between him and Pizarro as to the extent of the authority of each. Almagro seized Cuzco, but ultimately submitted to Pizarro, and was sent to the conquest of Chili. In 1535 he set out on his march, in which he crossed the Andes from Cuzco, and traversed the deserts of Atacama to the plains of Chili, a march of 350 leagues. After having suffered much fatigue and privation, he subdued several tribes of Indians; and it is said acquired 600,000 ducats in pieces of gold. He then again returned, seized Cuzco, and imprisoned the two brothers of Pizarro; but was attacked in the town and taken prisoner by Pizarro, who caused him to be tried by a court-martial, which condemned him to death for having rebelled against his general, and abandoned his post. This sentence was executed at Cuzco on the 25th April, 1536, Almagro being then in the 75th year of his age.

(Zarate, *Historia de la Conquista del Peru*, book iii.)

AL-MAMUN. [ABBASIDES.]

ALMANAC. The Arabic derivation of this word appears to be from *al*, the article, and *mana* or *manah*, to count.

An almanac is an annual publication, giving the civil divisions of the year, the moveable and other feasts, and the times of the various astronomical phenomena, including not only those which are remarkable, such as the eclipses of the moon or sun, but some of those of a more ordinary and useful character. The agricultural, political, and statistical information which is usually contained in popular almanacs, though as valuable a part of the work as any, is comparatively of modern date.

We find the first astronomers of every age and country employed either in their construction or improvement. The belief in astrology, which has prevailed throughout the East from time immemorial, rendered almanacs absolutely necessary, as the very foundation of the pretended science consisted in an accurate knowledge of the state of the heavens. With the almanacs, if indeed they had them not before, the above-mentioned absurdities were introduced into the West, and it is only within these few years that astrological predictions have not been contained in nine almanacs out of ten.

It is not known what were the first almanacs published in Europe. The Alexandrine Greeks constructed them in or after the time of Ptolemy. The earliest of which Lalande could obtain any notice, are those of Solomon Jarchus, published in and about 1150, and of the celebrated Purbach, published 1450—1461. The almanacs of Regiomontanus, the first ever printed, appeared in 1475. For an account of this and some other early almanacs, see the 'Companion to the Almanac,' for 1846.

The first astronomical almanacs published in France were those of Duret de Montbrison in 1637, which series continued till 1700. But there must have been previous publications of some similar description; for, in 1579, an ordonnance of Henry III. forbade all makers of almanacs to prophesy, directly or indirectly, concerning the affairs either of the state or of individuals. In England James I. granted a monopoly of the trade in almanacs to the Universities and to the Stationers' Company, and under their patronage astrology flourished till beyond the middle of the last century, but not altogether unopposed; the humorous attack of Swift, under the name of Bickerstaff, upon Partridge's almanac, is well known, both from the amusement which the public derived from the controversy and the perpetuation of the assumed surname in the 'Tatler.' But though Swift stopped the mouth of Partridge, he could not destroy the corporation under whose direction the almanac was published. The Stationers' Company (for the Universities were only passive, having accepted an annuity from their colleagues, and resigned any active exercise of their privilege) found another Partridge, as good a prophet as his predecessor; nor have we been without one to this day.

The Stationers' Company appears to have acted from a simple desire to give people that which would sell, whether astrological or not; and not from any peculiar turn for prophecy inherent in the corporation. Thus even in 1624 they issued at the same time the usual predictions in one

almanac, and undisguised contempt of them in another, apparently to suit all tastes. The almanac of Allstree, published in the above-mentioned year, calls the supposed influence of the moon upon different members of the body 'heathenish,' and dissuades from astrology in the following lines, which make up in sense for their want of elegance and rhythm :—

> "Let every philomathy (*i. e.* mathematician)
> Leave lying Astrology,
> And write true Astronomy,
> And I'll bear you company."

In 1775 a blow was struck which demolished the legal monopoly. One Thomas Carnan, a bookseller, whose name deserves honourable remembrance, had some years before detected or presumed the illegality of the exclusive right, and invaded it accordingly. The cause came before the Court of Common Pleas in the year abovementioned, and was there decided against the Company. Lord North, in 1779, brought a bill into the House of Commons to renew and legalize the privilege, but, after an able argument by Erskine in favour of the public, the House rejected the ministerial project by a majority of forty-five. The absurdity and even indecency of some of these productions were fully exposed by Erskine; but the defeated monopolists managed to regain the exclusive market by purchasing the works of their competitors. The astrological and other predictions still continued; but it is some extenuation that the public, long used to predictions of the deaths of princes and falls of rain, refused to receive any almanacs which did not contain their favourite absurdities. It is said (Baily, 'Further Remarks on the defective state of the Nautical Almanac,' &c., p. 9) that the Stationers' Company once tried the experiment of partially reconciling Francis Moore and common sense, by no greater step than omitting the column of the moon's influence on the parts of the human body, and that most of the copies were returned upon their hands. For more detail upon the contents of former almanacs, see the 'Companion to the Almanac' for 1829, and also the 'London Magazine' of December, 1828, and 'Journal of Education,' No. V.

The 'British Almanac' was published by the Society for the Diffusion of Useful Knowledge in 1828. Its success induced the Stationers' Company to believe that the public would no longer refuse a good almanac because it only predicted purely astronomical phenomena, and they accordingly published the 'Englishman's Almanac,' which is unexceptionable. Other almanacs have diminished the quantity and tone of their objectionable parts. But it is much to be regretted that the Stationers' Company still continues to make a profit out of the vile imposture called astrology. It is absurd to say that the only object is to provide amusement: for it is notorious that there is a large sale of works on astrology, much too dry and arithmetical to yield any amusement at all.

Of the professedly astronomical almanacs the most important in England is the 'Nautical Almanac,' published by the Admiralty for the use

both of astronomers and seamen. This work was projected by Dr. Maskelyne, then astronomer royal, and first appeared in 1767. The employment of lunar distances in finding the longitude, of the efficacy of which method Maskelyne had satisfied himself in a voyage to St. Helena, required new tables, which should give the distances of the moon from the sun and principal fixed stars, for intervals of a few hours at most. By the zeal of Dr. Maskelyne, aided by the government, the project was carried into effect, and it continued under his superintendence for forty-eight years. During this time it received the highest encomiums from all foreign authorities, for which see the French 'Encyclopédie,' art. 'Almanach,' and the Histories of Montucla and Delambre. From 1774 to 1789 the French 'Connoissance des Tems' borrowed its lunar distances from the English almanac. On the death of Maskelyne it did not continue to improve, and, without absolutely falling off, was inadequate to the wants either of seamen or astronomers. From the year 1820 various complaints were made of it in print. It was latterly stated that officers employed in surveys were obliged to have recourse to foreign almanacs for what could not be obtained in their own; that Berlin, Coimbra, and even Milan were better provided with the helps of navigation; and, finally, that the calculations were not made from the best and most improved tables. In consequence of these complaints, which were almost universally allowed by astronomers to contain a great deal of truth, the government, in 1830, requested the opinion of the Astronomical Society upon the subject, and the report of the committee appointed by that body, which may be found in the fourth volume of their 'Transactions,' is a sufficient proof of the opinion of practical astronomers on the previous state of the work. The alterations proposed by the Society were entirely adopted by the government, and the first almanac containing them was that for 1834.

The oldest national astronomical almanac is the French 'Connoissance des Tems,' published at present under the superintendence of the Bureau des Longitudes at Paris. It was commenced in 1679 by Picard, and continued by him till 1684. It then passed through the hands of various astronomers till 1760, when the conduct of it was given to Lalande, who, besides other alterations, first introduced the lunar distances, which have been already alluded to. At present the plan is very similar to that of the new 'Nautical Almanac,' with the addition of very valuable original memoirs which appear yearly. In fact we may say generally, that the original contributions to the various continental almanacs are among their most valuable parts; and, as Professor Airy remarks ('Reports of the British Association,' &c., p. 128), 'In fact nearly all the astronomy of the present century is to be found in these works,' that is, in certain periodicals which are mentioned, 'or in the Ephemerides of Berlin, Paris, or Milan.'

Next to the 'Nautical Almanac,' the private publication which is most entitled to notice as an astronomical almanac is White's 'Ephemeris,' a

work which is nearly as old as the monopoly previously described. For many years past, this publication has given astronomical data sufficient to enable the seaman to find his latitude and time. The 'Gentleman's Diary,' commenced in 1741, and the 'Ladies' Diary,' in 1705, have powerfully aided in keeping up a mathematical taste, to a certain extent, throughout the country, by annually proposing problems for competition: several, who have afterwards become celebrated in mathematics, have commenced their career by the solution of these problems.

The duty on almanacs was abolished in August, 1834, by 3 & 4 William IV. c. 57. The stamp was fifteen pence on each almanac. The average number of stamps issued between 1821 and 1830 inclusive, was about 499,000 yearly, producing an average revenue of about 31,000*l*. The largest number of almanacs stamped in any one year during the above period was 528,254 in 1821, and the smallest number was 444,474 in 1830; and in 1833, the year before the duty was abolished, the amount of duty was only 26,164*l*. The tax prevented the free competition of respectable publishers in almanacs, and tempted so many persons to evade the law, that unstamped almanacs were circulated in as large numbers as those which paid the tax. It is stated in the 'Report of the Commissioners of Excise Inquiry,' that 200 new almanacs were published as soon as the duty was repealed, of some of which upwards of 250,000 copies were sold, although the old ones not only maintained, but, in some cases, doubled their circulation. The most marked effect of the repeal of the duty is perhaps the improvement in the character of almanacs.

ALMANSOR, properly *Al-Mansur*, or, with his complete name, *Abu Jafar Abdallah Al-Mansur*, the second caliph of the Abbaside dynasty [ABBASIDES], was born at Homaima in Syria, A.D. 713, and succeeded his brother and predecessor, Al-Saffah, A.D. 753. His reign was occupied chiefly with contests for the throne and in repressing insurrections, some of which were of a sectarian character. From one of these he took a dislike to his residence at Kufa, and laid the foundation of the town of Bagdad, which became from this time the abode of the caliphs.

Al-Mansur died, September, 775, at Bir Maimuna, on a pilgrimage to Mecca: his son Al-Mohdi succeeded him in the caliphat. Al-Mansur first showed that predilection for literature which for several centuries became a distinguishing feature in the character of the Mohammedan sovereigns. During his reign translations were commenced of the works of ancient Greek writers on metaphysics, mathematics, astronomy, and medicine into Arabic.

ALME, or AL-MAI, i. e. 'the learned,' the name given by the modern Egyptians and Arabs to the dancing and singing girls of Egypt. They form a particular class or society, living together in bands, who are distributed in the various towns, or travel about the country in quest of employment. They are present at all festivals and marriages, and other ceremonies. The girls who are admitted into this society have generally a fine voice; they learn by heart the best songs on romance and love; and some are also able to sing extempore verses, after the manner of the Italian *improvisatori*. But they chiefly excel in pantomimic dances, which represent the various incidents of life, and, above all, the passion of love. The Almai also accompany funerals, at which they sing dirges, and utter groans and lamentations, like the *præficæ* of Sardinia, Corsica, and other European countries. Although there are Almai in Syria and other parts of the Ottoman empire, yet Egypt seems to have been at all times their favourite, and, as it were, their native country. The Bayadeers of India are a sort of Almai. [BAYADEER.]

ALMEIDA, a strongly-fortified city of Portugal, in the province of Beira: 40° 37′ N. lat., 6° 52′ W. long.: population 6000. The town lies between the rivers Coa and Turones, both tributaries of the Douro. The Spaniards took it in 1762, after a long and bloody siege. It was taken by Massena in 1810, and abandoned by him to an Anglo-Spanish army on the 9th of May, 1811.

ALMEIDA, FRANCISCO, seventh son of the Conde de Abrantes, was the first Portuguese viceroy of India. In his youth he distinguished himself against the Moors in Spain, and having been appointed viceroy by King Manoel (or Emanuel), on the 25th of March, 1505, he set sail from Lisbon. His force consisted of 1500 men, many of them noblemen of the king's household, all anxious to serve under so distinguished a leader.

After a prosperous voyage Almeida arrived at Quiloa on the 22nd of July. The Moorish king of that city, Habraemo, or Ibrahim, was not friendly to the Portuguese. Almeida displaced him, gave the crown to Mohammed Anconi, and built a fortress to keep the inhabitants in subjection. On his arrival at Cananor, on the Malabar coast, Almeida erected another fortress to protect the commercial establishments of Cananor, Cochin, and Coulan, and loaded eight vessels with spices, which he sent to Portugal. This squadron, in its way to Europe, discovered the Island of Madagascar.

Almeida sent his son Lorenzo with a considerable fleet against the King of Calicut, who had offered some injuries to the Portuguese merchants. But Lorenzo was unfortunate, he suffered himself to be surprised and defeated by the fleet of the Sultan of Egypt, who had become the ally of the King of Calicut, and he himself, fighting gallantly, lost his life. Almeida bore the disaster with fortitude, and was making preparations to revenge his loss, when Alfonso de Albuquerque, who was appointed governor of India in his place, arrived, and a quarrel ensuing, Albuquerque was sent to Cochin, where he was kept three months under arrest. [ALBUQUERQUE.]

Almeida, whose only object now was to gratify his vengeance, sailed to Onor, where he burnt some vessels of the King of Calicut, entered the port of Dabal, or Dabul, belonging to the King of Goa, on the 13th of December, 1508, took the town, and, after having plundered it, re-

duced it to ashes. He then went in search of the Egyptian fleet, and found it near Diu, in the kingdom of Cambay, and obtained a complete victory over it.

Almeida, having thus punished his enemies, returned to Cochin, where Marshal Coutinho, who had arrived from Portugal, urged him to return home. The viceroy released Albuquerque, surrendered his government, and sailed from Cochin on the 13th of Nov., 1508. On his way to Portugal, after having doubled the Cape of Good Hope, he stopped at Saldanha Bay to procure a supply of fresh water, and, in an affray with the natives, Almeida fell pierced with a lance, March 1, 1509.

(Barros, *History of the Portuguese Conquests in the East*, decade i., book 8, to the end—ii., book 1—4.)

ALMERIA, the ancient Murgis, the capital of the province of Almeria, in the kingdom of Granada, is near the outlet of the river Almeria, 253 miles S.S.E. from Madrid, and 70 miles E.S.E. from Granada, in 36° 51′ N. lat., 2° 31′ W. long. It has a population of 19,000, a convenient well-sheltered port, and some manufactures of saltpetre, soda, and cordage made of Spanish broom. During the time of the Moorish kings of Granada it was one of the most opulent commercial towns in their dominions. Cotton is now cultivated to some extent along the coast of Granada, about Motril, and as far as Almeria.

ALMOHADES. [Moors.]

ALMOND. [Amygdalus.]

ALMONER, once written Aumner and Amner, was an officer in a king's, prince's, prelate's, or other great man's household, whose business it was to distribute alms to the poor. Previous to the Dissolution every great monastery in England had its almoner.

In modern times the office of lord high almoner has been long held by the Archbishops of York. There is also a sub-almoner, an office which is at present filled by the Rev. Dr. Jey. The hereditary grand almoner is the Marquis of Exeter. There is an office appropriated to the business of the almonry, at Westminster, and an annual distribution is made in the queen's name, on the Thursday before Easter, called Maundy Thursday.

ALMORA, the capital of the district of Kumaon, in Northern Hindostan, is situated in 29° 35′ N. lat., and 79° 41′ E. long. This is the most considerable town possessed by the East India Company in that quarter of Hindostan: it stands on the ridge of a mountain 5337 feet above the level of the sea, in the midst of a bleak and naked country. Almora is approached by a long steep zigzag road. The town principally consists of one street fifty feet wide, and three-quarters of a mile long, with a gate at each end: this street has a natural pavement of rock. The houses stand on a lower story of stone, the superstructure being of wood; an arrangement which is rendered necessary by the frequent recurrence of earthquakes. Almora is 90 miles N. by E. from the city of Bareilly. (Bishop Heber's *Narrative of a Journey through the Upper Provinces of India*; Hamilton's *East India Gazetteer*.)

ALMORAVIDES. [Moors.]

ALMS-HOUSE, an edifice, or collection of tenements, built by a private person, and endowed with a revenue for the maintenance of a certain number of poor, aged, or disabled people. England is the only country which possesses alms-houses in abundance, though many such exist in Italy. In England, they appear to have succeeded the incorporated hospitals for the relief of poor and impotent people, which were dissolved by King Henry VIII.

ALNUS, or ALDER, is the generic name of a small group of plants belonging to the natural order *Betulineæ*. Several species are described in botanical works, most of which are found in America.

Alnus glutinosa, the common alder, is an inhabitant of swamps and meadows in all Europe, the north of Africa and Asia, and North America. Next to the charcoal from black dogwood (*Rhamnus frangula*), that supplied by the common alder is of the best quality. The bark is valuable for tanning, and the young shoots for dyeing various colours; the veiny knots of its wood are cut into veneer by cabinet-makers, and its stems, hollowed out, are among the best materials, next to metal, for water-pipes and underground purposes.

Alnus incána, the Turkey alder, or upland alder, is found all over continental Europe, from Sweden to the north of Italy, and east beyond the Caucasus, as far even as Kamtchatka.

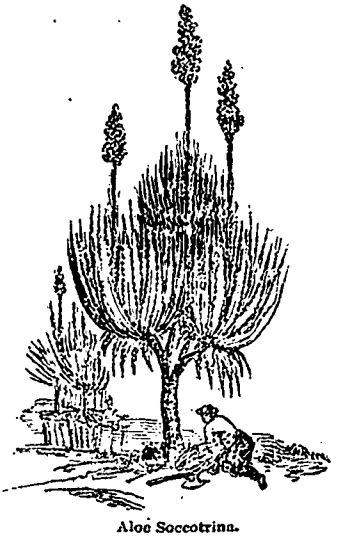
A. cordifolia, the heart-leaved alder, grows with rapidity, and is an interesting ornamental tree. Though a native of the kingdom of Naples, and a very distinct species, its existence was unknown till within the last twenty or thirty years. It is a perfectly hardy plant, notwithstanding its southern station.

ALNWICK, or ALNEWICK, a considerable town in the county of Northumberland, 34 miles N. by W. from Newcastle, and 310 N. by W. from London, stands in 55° 24′ N. lat., 1° 43′ W. long. The population of the township in 1841 was 4945. It is situated on a declivity on the south bank of the river Aln, over which is a stone bridge of three arches. The town is well laid out; the streets spacious, well paved, and lighted with gas; the houses chiefly of stone, of modern date, and some of them of considerable elegance. In the centre of the town is the market-place, a spacious square, on one side of which is the town-hall, a large stone building surmounted with a square tower; and on another side is a modern structure, erected by the late Duke of Northumberland, the under part of which is used as a market-place for the sale of butchers' meat, fish, and poultry; in the upper part there is a very elegant assembly-room, and also a spacious reading-room. The church is a very handsome edifice with a neat tower, dedicated to St. Mary and St. Michael. There are several meeting houses for dissenters; and chapels for the Wesleyan methodists, and Roman Catholics.

The most remarkable object connected with Alnwick is the ancient castle to the N.W. of the town, the residence of the Duke of Northumber-

land, which is one of the most magnificent specimens in the kingdom of an old baronial residence. The castle is built of freestone, and in the Gothic style. The grounds, which are five miles long, and through which the Aln flows, exhibit every species of natural and artificial beauty, including the remains of two ancient abbeys.

ALOE, a genus of succulent plants belonging to the natural order *Asphodéleæ*. The species which has the reputation of producing the best aloes is *Aloe Soccotrina*. It is a native of the



Aloe Soccotrina.

Cape of Good Hope, and the Island of Soccotra. No plants can be more easy to cultivate artificially than the aloe tribe. They require a green-house which is capable of being maintained at a temperature not less than 40° in the depth of winter, at which time they should have no water whatever; in the summer they want no fire heat, but may be watered regularly.

ALOES, *Medical Properties of*. Though known to the ancients, and largely used in modern times, the sources of this drug are not accurately determined. Attention to the mode of extracting the juice might render aloes, whencesoever procured, of excellent quality. But from the different plans of collecting and inspissating the juice, results an article which differs considerably in appearance and greatly in value. Aloes is one of the few drugs in which adulteration is not extensively practised further than by substituting the inferior and low-priced kinds for the superior. When carelessly prepared, sand and fragments of leaves and skins are frequently found in the samples.

A few of the most important sorts found in commerce may be noticed. The finest sort, to which the term Socotorine aloes is given, can scarcely be regarded as one of daily occurrence, and is noticed merely as a standard of excellence by which to judge of others according to the degrees in which they approximate to it.

The chief varieties go by the name of—Socotorine; East Indian, called also frequently *hepatic;* and Cape aloes (*Aloe lucida* of Geiger and Theod. Martius), also called *A. Cabo*. Innumerable sub-varieties of these are found. Caballine, or *horse* aloes, has nearly disappeared from commerce, refinement or fashion in veterinary medicine deeming it not fit for horses. Barbadoes aloes comes to this country in the gourds and calabashes into which it is poured when prepared. Each of these weighs from sixty to even eighty pounds.

The most recent chemical analyses of aloes have been made by continental chemists, and although they designate the specimens analysed, it cannot be accurately known how far they correspond with the kinds so called in Britain. The chief constituents, however, are, *aloesin* (or saponaceous principle), present sometimes to the amount of 81 per cent.; *resin*, varying from 25 to 50 per cent.; *vegetable albumen*, absent from the best kinds, present in others from 5 to 12 per cent.; *gallic acid*, a trace according to Traunsdorff; *aloetic acid*, according to Pereira.

Few more valuable drugs exist, as is proved by the numerous preparations made either of aloes alone, or with some other articles combined with it. These combinations have various objects in view, some to heighten its powers, others to modify, and some to get rid of certain well-founded objections to its effects.

In large doses it is decidedly aperient, but is unlike many other cathartics, in so far that increasing the dose beyond a certain point by no means increases the effect. This can be accomplished, however, by associating it with other cathartics, and still more decidedly by uniting it with tonics, such as iron or quinia. Aloes and quinia, with antimonial powder, and aromatic powder to cover the unpleasant taste, form a combination of great utility in many gastric derangements, especially where the head is implicated. The combination which increases the purgative power of aloes in the most remarkable degree is formed by adding one drop of strong (undiluted) sulphuric acid to four grains of Barbadoes aloes, and forming a pill, two of which, given every two, four, or six hours, will almost invariably relieve the most obstinate cases of constipation, such as occur in painters' colic, ileus, and other diseases. It is even more efficacious than croton-oil, and not so apt to excite inflammation of the intestines.

Aloes, especially the compound decoction, is a most valuable emmenagogue, particularly when combined with tincture of ergot or preparations of iron. From its action on the lower part of the bowels it is deemed an improper purgative in pregnancy, or during the menstrual flux. It is also considered improper for persons subject to piles. The best means of covering the unpleasant taste of aloes, when given in the liquid form, is the compound tincture of lavender.

ALONSINE or ALPHONSINE TABLES, an astronomical work, which appeared in the year 1252, under the patronage of Alonso X., in the first year of his reign. The general opinion

is, that these tables were constructed by Isaac Ben Said, a Jew, but others suppose that Al Cabit and Aben Ragel, the preceptors of Alonso, were the real superintendents. A full account of their contents may be seen in Delambre, 'Hist. de l'Ast. du Moyen Age,' p. 248. Till the time of Copernicus and Tycho Brahé they continued in general use, being in truth, with some modifications, a body of Ptolemæan astronomy. They were first printed in 1483.

ALONSO is the name of several kings of Spain and Portugal. This name is written by the Spaniards Ildefonso, Alphonso, Alfonso, and Alonso, and by the Portuguese Affonso. We have chosen the form Alonso, as being that in most common use.

ALONSO I., surnamed the Catholic, was chosen King of Leon in 739. He was the son-in-law of Pelayo, and a descendant of King Leovigild. He wrested from the Moors Lara and Saldaña, in Castile, and extended his confined empire over nearly one-fourth of Spain. He died in 757, and was succeeded by his son, Fruela I. (Mariana, book vii. chap. 6.)

ALONSO II., called the Chaste, elected King of Leon in 791, was the nephew of Bermudo the Deacon. His reign was a continual scene of warfare both against the Moors and against his rebellious subjects. The amours of his sister, Doña Ximena, with the Count of Saldaña—the wonderful exploits of Bernardo del Carpio, who was the offspring of this love, against the no less famous French hero Roland—also belong to this period. All this history, however, is considered by the best critics as belonging to the region of fable and romance. Alonso died about the year 843; he was succeeded by Ramiro I., son of Bermudo the Deacon. (Mariana, vii. 9, 12.)

ALONSO III., surnamed *El Magno* (the Great), King of Leon, succeeded his father, Ordoño I., in 866, at the age of fourteen. Successful against his Christian enemies in the early part of his reign, Alonso next turned his attention to the Mohammedans; and in thirty years of continual warfare his arms were always crowned with victory. He extended the boundaries of his empire to the banks of the Guadiana. But his own son Garcia, aided by the ever-rebellious barons, by his father-in-law the Count of Castile, by his brother Ordoño, governor of Galicia, and even by his own mother, attempted to dethrone the rightful monarch. Alonso succeeded in crushing the rebellion, and taking his son prisoner, but, fearing the evils of a civil war, he called a junta in 910, and abdicated the crown in favour of Garcia. The government of Galicia he entrusted to his second son, Ordoño, and the youngest, Fruela, had that of Oviedo bequeathed to him. He died at Zamora in 912, having reigned forty-six years, and was a brave, just, and generous prince; he was succeeded by his son Garcia. (Mariana, book vii. chap. 17—20.)

ALONSO IV., called *El Monge* (the Monk), King of Leon, succeeded Fruela II. in 925. Six years after his accession to the throne, he abdicated in favour of his brother, Ramiro II., and retired to the monastery of Sahagun. On attempting to regain his crown, he was defeated by his brother, who consigned him to a monastery, and sentenced him to the loss of his eyes. He died ten years afterwards. (Mariana, book viii. chap. 5.)

ALONSO V. succeeded his father, Bermudo, on the throne of Leon in 999, being only five years of age. The government, during his minority, was entrusted to a regency, which was a very eventful one. During it the great Almansor was defeated, and this success led to the conquest of Cordova. Alonso was killed at the siege of Viseu in 1028: his son, Bermudo III., succeeded him. (Mariana, book viii. chap. 10, 11.)

ALONSO VI. was the son of Fernando I. He was crowned King of Leon in 1066. Fernando had committed the same fault as his father in dividing his states among his children. He left Leon to Alonso, Castile to Sancho, Galicia to Garcia, and the cities of Toro and Zamora to Urraca and Elvira, his two daughters. This produced a long civil war, during which Sancho was assassinated, and Garcia made and kept prisoner till his death. Having thus acquired so large a portion of the peninsula, Alonso turned his arms against the Saracens. He invaded Portugal, and made most of the Moorish petty chiefs his tributaries. He afterwards took Coria, and then attacked Toledo; and had not the Almoravides with a powerful army invaded Spain, he would have expelled the Moors from the peninsula. He gave his illegitimate daughter, Theresa, in marriage to Henry, count of Besançon, with his conquests in Portugal, and the title of count. During his reign the famous hero Rodrigo Diaz de Vivar, surnamed the Cid or Sidi, the Moorish word for Lord, performed those exploits which have furnished abundance of materials to romance writers.

King Alonso died in 1109, at Toledo, in the seventy-ninth year of his age, and forty-third of his reign. His son Sancho having fallen in a battle against the Moors, the crowns of Leon and Castile fell to his eldest daughter, Urraca.

(Mariana, books ix. x. chap. 8—20, 1—8.)

ALONSO VII. [Alonso I. of Aragon.]

ALONSO VIII., king of Castile and Leon, styled the Emperor. At the death of his mother, Queen Urraca, he became king, in 1126. His reign was occupied by many inconclusive wars, but he obtained some advantages over the Mohammedans, and advanced the Castilian frontiers to Andalucia. His last battle against the Almohades was indecisive; after which he returned towards Toledo, and died in his tent in August, 1157. At the close of his reign, the military order of Alcántara, to which Christian Spain owed so much, was instituted. He was succeeded in Castile by Sancho III., and in Leon by Fernando II. (Mariana, books x. xi. chap. 8—20, 1—7.)

ALONSO III., of Castile, was only three years of age at the death of his father, Sancho III., in 1158. Alonso married Eleanor, daughter of Henry II., of England, in 1170, and from that time he exercised the regal authority without control. In 1195, he was defeated by the Almohades at Alarcos, but he avenged this affront in

the famous battle of Las Navas de Tolosa. [Moors.] Shortly after this memorable victory, he died at Garci Muñoz, in 1214: he was succeeded by his son, Enrique I. (Mariana, books xi. xii.)

ALONSO IX., king of Leon, succeeded his father, Fernando, in 1188. His reign is not distinguished by any thing beyond the usual contentions of the time, except that he quarrelled with Pope Celestine, on account of his marriage, and recovered Estremadura from the Moors. He died at Villanueva de Sarria, in 1230, after a very stormy reign of forty-two years. His son, Fernando III., succeeded to the crowns of both Leon and Castile. (Mariana, books xi., xii., chap. 16—22; 1, 2.)

ALONSO, or ALFONSO X., surnamed *El Sabio* (the Wise), King of Castile and Leon, was the son of Ferdinand III., called the Saint. He was born in 1222, and in the following year was acknowledged crown prince by the Cortes at Burgos. While crown prince, he took the kingdom of Murcia from the Moors, and accompanied his father to the conquest of Seville. In 1252 he was proclaimed King of Castile and Leon, in the city of Leon, after his father's death. The first act of his reign was to renew the alliance with Alhamar, the Moorish King of Granada, and to relieve him from the tribute which he paid to Castile, in acknowledgment of the eminent services which that king had rendered to his father.

In 1256 he was proposed as a candidate for the empire of Germany, but though supported by the Elector of Saxony and the Archbishop of Treves, the project failed.

The Moors of Spain having received considerable reinforcements from Africa, made an irruption into the territory of Castile, and reconquered Jerez, Arcos, Medina-Sidonia, Bejer, San-Lucar, and other places; but their triumph was of short duration. In the following year, Alonso, with a considerable force, marched against them, defeated them in a succession of battles, and forced the King of Granada to do homage to Castile, and pay a considerable sum as an indemnification for the expenses of the war.

The latter part of his life was embittered by domestic strife. His son, Sancho, rebelled against him, and for a time he was deposed. There were many vicissitudes in the contest, and he always manifested great affection for his undutiful son, but at length, overpowered by misfortunes, he died on the 21st of April, 1284. In his will he expressed his desire that his grandchildren, the sons of Fernando, should succeed him, and in case of their death the King of France, making no mention of Sancho, who, however, succeeded him. Alonso was buried at Seville. 'He was the first King of Spain,' says Mariana, 'who ordered all public documents to be written in Spanish, with the view of polishing and enriching the language. He caused also the Bible to be translated. It is indeed astonishing,' adds he, 'that a king who had been brought up in war, and exercised in arms from his early youth, should be acquainted with astronomy, philosophy, alchemy, jurisprudence, and history, to a degree scarcely attained by men enjoying a life of leisure, or having no other occupation than study.' He has left us a monument of his learning, or of his patronage of learning, in his 'Chronica de España,' in the astronomical tables called 'Alfonsinas,' in a code of laws denominated 'Las siete Partidas,' and in some poems and other productions, which are still inedited.

(*Chronica del Rey Don Alonso*, in British Museum; Mariana, *Historia de España.*)

ALONSO XI., king of Castile and Leon, succeeded his father, Fernando IV., in 1312, being only a few months old. A long series of convulsions attended his minority. When he came of age he quieted the intestine disturbances, and seriously pursued the wars against the infidels. He took Tarifa and Algeciras from them, but died of the plague while besieging Gibraltar, in 1350. He was succeeded by his son, Pedro the Cruel. (Mariana, book xv.)

ALONSO I., king of Aragon, surnamed *El Batallador* (the Fighter), succeeded his brother Pedro in 1104, and having married Queen Urraca of Castile and Leon, was styled king of those provinces also. The marriage was not happy; he applied to the pope to annul it; and in 1114, a council assembled at Palencia solemnly decided on the separation of the ill-sorted couple. He then carried on a successful war against the Moors, and extended his victories even as far as Andalucia, but was killed in a battle near Fraga, in 1134. He was succeeded by his brother Ramiro II. (*Chronica Adefonsi Imperatoris*, vol. xi.; Mariana, x. 8.)

ALONSO II. succeeded his mother Petronila on the throne of Aragon when he was only eleven years of age. In 1167 he became Lord of Provence, by the death of his cousin, Count Gerard. He extended the frontiers of his kingdom on the side of the Mohammedans, penetrated into the territory of Valencia, and aided Alonso IX. of Castile in investing Cuenca. For this important service Aragon was made exempt from paying homage to Castile. Alonso died in 1196; and according to a custom very prevalent in Spain at that period, he divided his states between his children, leaving Aragon, Catalonia, and Roussillon to his eldest son, Pedro II.; and Provence to the second son. (Mariana, xi. 9—13.)

ALONSO III., was the son of Pedro III., king of Aragon. At the death of his father, in 1285, he was at Majorca, where he had been sent by his father to dethrone his uncle Jaime, who had usurped the sovereignty of that island. His reign was disturbed by continual internal dissensions, and he died at Barcelona in 1291, and was succeeded by his brother, Jaime II. (Mariana, xiv.)

ALONSO IV., son of Jaime II., ascended the throne of Aragon in 1327. The Genoese not only fomented dissension in his new conquest of Sardinia, but even dared to attack him in his own kingdom. They made various descents on Catalonia and Valencia, but were repulsed. At home, his son and successor Pedro raised the standard of revolt against him, because his father had given some possessions to his half-brother Alonso. These dissensions were in a great measure the cause of

his death, which took place in Barcelona in 1336. He was succeeded by his son, Pedro IV. (Zurita's *Anales*, book vii.)

ALONSO V. [ALFONSO I. of Sicily.]

ALONSO I., king of Portugal, was the son of Henry, count of Besançon, who held Portugal in fief with the title of Count. At his father's death Alonso was only two years old, and his mother governed the state in his minority, and he was forced to apply to arms and wrest the sovereignty from her. He subsequently defeated the Moors at Ourique in 1139, when the Portuguese historians state that they left 200,000 dead on the field. In the exultation of victory the count was proclaimed king by his followers, which title he assumed from that day.

In 1146 Alonso took by assault the fortress of Santarem from the Saracens, and in the next year he took Lisbon, when the fleet of English crusaders, who were going to the Holy Land, rendered him very effectual assistance. In short, Alonso almost freed all Portugal from the yoke of the Saracens.

This king, the founder of the Portuguese monarchy, was not a warrior only—he was also a legislator. Under his reign a code of laws was promulgated at the Cortes of Lamego. These laws chiefly treated on the succession to the crown, the duties of the nobles and the people, and the independence of the kingdom.

Alonso died in 1185, at Coimbra, in the 91st year of his age, and was succeeded by his son, Sancho I. (Brandaon's *Monarchia Lusitana; Chronicon Lusitanum.*)

ALONSO II. ascended the throne of Portugal in 1211, on the death of his father, Sancho I. His reign was distinguished only by intestine wars, and he quarrelled with his clergy and Pope Honorius III., who placed the kingdom under an interdict. Alonso was forced to yield, and was pardoned on his promise of making satisfaction for his past offences. Before he could fulfil his promise, he died, in 1223, and was succeeded by his son, Sancho II. (Rodericus Toletanus, book viii.; Lemos, book xii.)

ALONSO III. succeeded his brother Sancho II., in 1248. Before his accession, while a poor exile in France, Matilda, countess of Boulogne-sur-Mer, not only gave him protection, but, together with her hand, conferred on him her states and property. His brother having attacked, like his father, the immunities of the church, was, by a decree of Innocent IV., deprived of the regal authority, and Alonso entrusted with the administration of the government. He sailed for Lisbon, and on his arrival was received with enthusiasm by all classes of the nation. His brother retired to Toledo, where he died in 1248.

Alonso embroiled himself with his namesake of Castile about the possession of Algarve, but finding his antagonist too powerful for him he sued for peace, and married Beatriz de Guzman, daughter of the Castilian, shamefully deserting his great benefactress, the virtuous Matilda, on the plea of her barrenness. Alonso's conquests from the Mohammedans were not very numerous. He died in 1279, after a reign of thirty-one years, and was succeeded by his son, Dennis. (Mariana, book xiii.; Lemos, book xiii.)

ALONSO IV., surnamed the Brave, ascended the throne of Portugal on the death of his father Dennis in 1325, against whom he had rebelled in his lifetime. During a stormy reign of thirty-two years, the chief event was the murder of Inez de Castro, the mistress of his son Pedro, which plunged the nation in a civil war. Father and son were at length reconciled, and he died in 1357, when his son Pedro I. succeeded him. (*Chronicon Conimbricense;* Lemos, book xvii.)

ALONSO V. was the son of Duarte. At the death of his father in 1438 he was only six years of age. His minority was very disturbed and eventful. In 1446, Alonso having reached his fourteenth year, seized the reins of government.

In 1457 he fitted out an expedition against the Moors. He landed in Africa with 20,000 men, and took Alcazar, Seguer, and Tangier. Notwithstanding his partial success, he encountered many reverses. He also engaged in an unfortunate war with Castile; and not long after, having concluded a peace with that nation, died at Cintra, of the plague in 1481, in the forty-ninth year of his age, and forty-third of his reign.

Alonso V. collected a copious library, and gave his protection to all literary persons. He was succeeded by his son, Joaõ II. (Ruiz de Pina's *Chronica do Senhor Rey Dom Affonso V.*).

ALOPECU'RUS is a genus belonging to the natural order *Gramineæ*, or grasses. It contains many species, the only important among which is *Alopecurus pratensis*, the meadow foxtail grass, a valuable plant to the farmer. It is so much larger than any other British alopecurus as to be easily recognized. It grows commonly in meadows, where it forms rather a coarse but an abundant and early herbage, of which cattle are very fond.

ALOST, or AALST, a town of Flanders, on the Dender, 15 miles W.N.W. of Brussels, 50° 56′ N. lat., 4° 5′ E. long., has a population of 14,800, who carry on a considerable trade, vessels of small size being able to ascend the river as far as Alost. The cathedral of St. Martin is unfinished or in part destroyed, but what remains is very beautiful. Good hops are grown in the neighbourhood. Alost is four or five miles south of the railroad from Ghent to Mechlin.

ALP ARSLAN ('the Brave Lion'), or with his complete name, *Mohammed ben Daud Alp Arslan*, born A.D. 1030, was the nephew of the Seljukide Sultan Togrul Beg. Togrul Beg died in 1063, and as he left no children, his nephew, Alp Arslan, who had till then been governor of Khorasan, succeeded him as sultan of the Seljukes. Alp Arslan was about to extend his dominions by conquests in Transoxiana, when a revolt in Azerbijan, instigated by Kutulmish, required his presence there. He defeated the rebellious prince near the city of Rei, and resumed in the ensuing year (1065) his conquests in Transoxiana, while his vizir Nizam-al-Mulk endeavoured to promote the welfare of the interior, and to advance the interests of literature and education by establishing colleges in the principal towns of the empire.

The greater part of Syria was at this time already in the hands of the Turks, and the troops of the Greek emperor offered but little resistance to their further progress. Romanus Diogenes, who came to the throne in 1068, resolved to take more vigorous measures against them. He joined his army in person, and defeated the Turks in several battles in Cilicia and near Malatia; but he was unsuccessful in an expedition against Khelat, and was, in 1071, taken prisoner in a battle near Malazkurd (or Melezghird) in Armenia. Alp Arslan treated him generously, and on his promise to pay a considerable ransom, released him and all the noble prisoners from their captivity. But the Greeks had, in the mean time, placed Michael Parapinacius upon the throne, by which circumstance Diogenes was prevented from fulfilling his engagement. This caused a renewal of hostilities. Alp Arslan's son, Malek Shah, conquered Georgia, while the sultan himself was preparing an expedition against Turkestan. He crossed the Jihon, and commenced the war by taking the fort of Berzem; its governor, Yussuf Kothual, was led before Alp Arslan as a prisoner, and when reproached by him for the trouble he had given him by his long and useless resistance, became so incensed, that he rushed upon the sultan, and with a dagger inflicted a mortal wound upon him, of which he died in 1072. Alp Arslan was buried at Merve in Khorasan. His son Malek Shah succeeded him in the government.

ALPA'CA, or PACO. The natural history of this animal is treated of under LLAMA. The introduction of alpaca wool in manufactures has attracted considerable attention, and the question of naturalizing the alpaca in this country, in Germany, and in Australia, is also an object of much interest. The wool of the alpaca is superior to English wool in length, softness, and pliability. The fleece averages from 10 to 12 lbs., while that of our sheep is seldom more than 8 lbs.; and while the staple of English wool does not often exceed six inches in length, that of the alpaca varies from eight to twelve inches. The lustrous appearance of the alpaca wool renders it applicable to many of the purposes for which silk is usually employed in textile fabrics; and it is found a useful substitute for Angora wool. The manufacture of plain and figured stuffs from the fleece of the alpaca was commenced at Bradford, in Yorkshire, a number of years ago, and there is a large and increasing use of alpaca wool. In 1844 five different articles were manufactured at Bradford for her Majesty, from the wool of an alpaca which had been kept at Windsor.

Besides the use of the wool in textile fabrics, the flesh of the alpaca is also wholesome and palatable. The carcase weighs on an average about 180 lbs.

The question of naturalizing the alpaca has been taken up with great enthusiasm by a few persons; but very little progress has yet been made in convincing persons of its practicability. The alpaca inhabits the mountainous and inhospitable regions of Peru, and is remarkable for its abstemiousness. It thrives on coarse food. Those which have been brought to this country have been confined in parks and richly cultivated lands, and have been treated with too much care and tenderness. Mr. Walton asserts that they will live where our hardiest sheep would starve, and that the wildest parts of Great Britain are best suited to their habits. If the alpaca may be pastured on lands which are now waste and unprofitable, and where the hardiest sheep would starve, the naturalization of the animal would undoubtedly prove a great national benefit; but if this is not the case, it is a question whether a constant demand for the wool as an article of import would not be quite as beneficial.

(Walton, *On the Alpaca; its Naturalization in the British Isles considered as a National Benefit.*)

ALPES, BASSES, a department of France, which once formed part of Provence, is bounded N. by the departments of Hautes Alpes and Drôme, E. by the Sardinian states, S. by the department of Var, and W. by that of Vaucluse. It lies between 43° 41′ and 44° 40′ N. lat., and between 5° 29′ and 6° 53′ E. long. Its length from N.E. to S.W. is 88 miles, and its mean breadth 55 miles. The surface occupies 2,635 square miles. The population in 1841 was 156,055, which gives an average of 59.3 to the square mile, being 108.7 below the average per square mile for all France.

The department is situated on the western slope of the Alps, branches of which cover the greater part of its surface. The temperature, except in the south, is cold and variable: in the high valleys, which are for the most part unfruitful, the snow lies during six months in the year. In the south and south-west the valleys widen into plains, which are, generally speaking, the only good lands in the department. There are extensive forests of larch, fir, oak, pine, beech, and chestnut. On the southern slopes of the mountains in the south, myrtle, lavender, thyme, and other aromatic plants are found: here also truffles abound. There are mines of iron, copper, and coal; sulphur, granite, marble, plaster of Paris, potters' and fullers' clay are found, and there are several mineral and salt springs.

Of the whole area of the department (1,686,813 acres) 138,376 acres are covered with forests. Corn and potatoes are grown, and fruit, especially the plum, is cultivated in great quantities: the almond, the fig, the olive, and the mulberry, flourish in the warm districts of the south. Horned cattle and sheep of an improved breed are numerous, and find ample pastures on the mountains. Horses are small in size and few in number, mules being preferred in a mountainous country. Great attention is paid to the nurture of silk worms and bees. Coarse cloth, leather, hats, and pottery are the principal manufactures. The wine of the department is of inferior quality. The chief trade is in brandy, oil, leather, honey, and dried plums. The inhabitants are in general poor, and emigrate yearly to Paris and other large towns.

The rivers of the department being all mountain streams, are liable to sudden inundations, which often cause great ravages in the lower grounds. The chief are the Durance, the Verdon, the Bléone, and the Asse. The Durance rises at

the foot of Mount Genèvre, in the department of Hautes Alpes, after leaving which it traverses that of Basses Alpes, then flows between the departments of Vaucluse and Bouches du Rhône, and enters the Rhône below Avignon, having in its course passed under the walls of Briançon, Mont Dauphin, Embrun, Sisteron and Cavaillon, and having run first from N.N.E. to S.S.W., then from E. to W. a distance of 204 miles, of which the last 176 are available for raft-floatage, and some miles higher up for floating loose timber. The principal feeders of the Durance are the Guisane, the Gironde, the Buech, the Calavon, on the right bank; the Guil, the Sasse, the Ubaye, the Bléone, the Asse, and the Verdon, on the left; of these the four last are available for floating loose timber.

The department is divided into five arrondissements, which, with their subdiyisions and population, are as follows:—

Arrond.	Cantons.	Communes.	Pop. in 1841.
Digne	9		52,045
Barcelonette . .	4	20	18,561
Castellane . . .	6		23,770
Forcalquier . .	6	52	36,118
Sisteron . . .	5	50*	25,561
Total . .	30		156,055

In the arrondissement of Digne, the chief town is Digne, the Dinia of the Romans, which is also the capital of the department; population 4600. It is built on a hill on the left bank of the Bléone, in 44° 5′ N. lat., 6° 14′ E. long., and is 473 miles S.E. of Paris, by the road through Lyon, Grenoble, and Gap. The town is ill-built, the streets narrow and winding; it is surrounded with old walls, flanked by square towers. Digne is the seat of a bishop, has a tribunal of first instance, a college, a seminary, and an agricultural society. The chief trade of the place is in agricultural produce, dried fruits and leather. There are hot springs in the neighbourhood which were known to the Romans. The other towns are—Thoard, in a deep valley N.E. of Digne, population 1000: Barrême, on the Asse: Javie, a small place on the left bank of the Bléone: Mées, on the left bank of the Durance, population 2000: Moutiers or Moustiers, which manufactures woollens, paper, and china; population 2000: Riez, which contains several Roman remains: Seyne, in which tiles and ropes are made: Gréoux, which has hot springs and several Roman remains: and Valensole, which has a population of 3430, and some manufactures of cutlery and leather.

In the arrondissement of Barcelonette, the chief town is Barcelonette, situated on the Ubaye, in a lovely valley 3818 feet above the level of the sea. The town has a college, and a tribunal of first instance: it was built in 1230, by Raymond Beranger, and named from Barcelona in Spain, whence his ancestors came. In the wars between France and Savoy the town was often taken; it has belonged to France since 1715. On the neighbouring mountains, which afford good pasture, great numbers of horned cattle and sheep are fed. The other towns are—Alloz, near the Lake of Alloz, on the northern slope of the mountains: Lauzet: and St. Paul, on the right bank of the Ubaye.

In the arrondissement of Castellane, the chief town is Castellane, on the Verdon; its population is 2000, and its chief trade is in dried plums. The other towns are—Senez, near which is a salt spring: Entrevaux, a fortress on the right bank of the Var: Annot: Colmars, a fortified town on the left bank of the Verdon, near the Sardinian frontier; there is an intermittent spring in the environs, of which the period of flow and of cessation is seven minutes.

In the arrondissement of Forcalquier the chief town is Forcalquier, built on a hill above the Laye; population 2133; hats, pottery, brandy, and druggot are made; coal is found in the environs. The other towns are—Manosque, the most flourishing town in the department, population 7000; it is situated in a fertile district, has fabrics of silk and coarse cloth, and trades in wine, brandy, fruits, and wool; there is a tribunal of commerce and a college in the town; a coal mine is worked in the neighbourhood: Peyruis, on the right of the Durance: and Reillane, population 1320.

In the arrondissement of Sisteron, the chief town is Sisteron, situated at the junction of the Buech with the Durance, both of which are here crossed by stone bridges. The town is defended by an old castle, in which Casimir, brother of Ladislaus VII., king of Poland, was imprisoned for some time by order of Richelieu. There is a tribunal of first instance, a college, and an agricultural society in the town; the population is 4429. The soil in the neighbourhood is calcareous; good wine and great quantities of nuts and almonds are produced. Hats and leather are the chief manufactures, and there is some trade in wool, oil, and agricultural produce. Ancient vases, coins, and urns are often dug up, marking the place as known to the Romans, who called the town Segustero.

The department returns two members to the Chamber of Deputies, forms the diocese of Digne, lies within the jurisdiction of the Cour Royal and of the University Academy of Aix, and is included in the eighth military division, of which Marseille is head-quarters.

(*Géographie Universelle;* Balbi, *Géographie.*)

ALPES, HAUTES, a department of France formed out of portions of Dauphiné and Provence, is bounded N. by the department of Isère, E. by Piedmont, S. by the department of Basses Alpes, and W. by that of Drôme. It lies between 44° 11′ and 45° 7′ N. lat., and between 5° 23′ and 7° 8′ E. long. The length of the department from N.E. to S.W. is 85 miles, the mean breadth about 30 miles; its area is estimated at 2136 square miles: the population in 1841 was 132,584, which gives an average of 62 to the square mile, being 106 under the average per square mile for all France.

The department is covered with enormous masses of mountains, separated into groups, and surrounded by heights of less elevation, between

which valleys branch out in all directions. Among the mountains are the highest points in France: Mont Olan, Mont Pelvoux-de-Vallouise, in the north of the department, Mont Viso and Mont Genèvre in the east, rise respectively to heights of 13,821, 13,431, 12,575, and 11,776 feet above the level of the sea. The passes by which the valleys communicate with each other are many of them above 7000 feet high; the col of Mont Genèvre by which Hannibal is said to have crossed into Italy is 6355 feet above the sea level. There are several glaciers, one of which, the glacier of Chardon, near Berarde, is nearly three miles long. The south side of the mountains is bare, rocky, and desolate, while the northern sides are covered with forests up to the line where vegetation ceases. Some of the lower heights are crowned with woods, others consist of rich downs, which afford pasture to numerous flocks of sheep from the departments of Var and Bouches-du-Rhône: several of them, in favourable situations, are planted with vines. The department abounds in fine scenery, which attracts many pedestrian tourists: among other places much visited may be mentioned the valley of Fressinière, in the neighbourhood of Mont Pelvoux-de-Vallouise, and the valleys of Queyras and Pragelas, E. of Embrun. The climate is very cold in winter, which in the high valleys lasts during eight months: on the other hand the heat is very great during summer in the narrow valleys. Violent winds, especially from the west, are frequent and destructive, often blowing down trees and houses.

The department has 138,488 acres of forests, in which larch, fir, ash, maple, linden, and chestnut are the most common trees. Copper, lead, zinc, iron, antimony, asbestos, slate, marble, sulphur, coal, plaster of Paris, alum, and rock-crystal are found. There are hot salt and mineral springs. Game and fish are abundant. Of horses there are few; mules and asses are numerous. There are great numbers of sheep, which are of large size, and their wool is of good quality. Corn, potatoes, hemp, flax, and fruit, are cultivated. The department has some cotton, linen, and cloth factories, but its chief trade is in wine, wool, cattle, and its mineral products. Poverty prevails to a great extent among the inhabitants, many of whom emigrate on the approach of winter to the neighbouring countries.

The rivers of the department are the Durance [ALPES, BASSES], the Buech, the Guil, and the Drac. The Buech rises in the department of Drôme, and falls into the Durance at Sisteron, having run a course of about 38 miles from N.E. to S.W., most of which is in Hautes Alpes, and available for floatage. The Guil rises in Mont Viso, and falls into the Durance below Mont Dauphin. The Drac rises N.E. of Mont Dauphin, flows in the direction of N.W., and enters the department of Isère, where it is joined by the Romanche and several other small rivers, and falls into the Isère below Grenoble, having run 82 miles, part of which is available for floatage. Great works have been completed for deepening the bed of this river, in order to prevent its inundations, which were formerly very destructive.

The department is divided into three arrondissements which, with the number of cantons, communes, and population in each, are as follows:—

Arrond.	Cantons.	Communes.	Pop. in 1841.
Gap	14	125	69,138
Briançon . . .	5	27	31,005
Embrun . . .	5	36	32,441
Total . . .	24	188	132,584

In the arrondissement of Gap, the chief town is Gap, the Vapincum of the Romans, which is also the capital of the province, 418 miles S.E. of Paris, by the road through Lyon and Grenoble, in 44° 33′ N. lat., 6° 4′ E. long. It is an ill-built and much decayed town, with a population of 8600. There are a college, tribunal of first instance, several churches, one of which is of the reformed religion, a seminary, a museum, and a theatre, in the town. The most remarkable buildings are the cathedral, which contains the mausoleum of the Duc de Lesdiguières, and the town-hall. Coarse cloth, hats, cutlery, calico and serge are manufactured, and the trade of the town is in these articles, and in grain, fruit, cattle, and wool. Near the town is the Lake of Pelhotiers, in which there is a floating island. The other towns are—St. Bonnet, on the Drac, population 1500: Laragne, in the south of the department: Orpierre, W. of Laragne, near which are lead mines: Ribiers, on the right bank of the Buech, which has manufactures of serge, iron-ware, and silk yarn: Serres, also on the right of the Buech, in which hats, linen, and leather are made; some fine veined and tinted marble is found near Serres: Rozans, a small village: Tallard, on the right of the Durance, population 1059: and Veynes, on the right bank of the Buech, which has a population of 1850, and some trade in wool and leather. In the environs there are several Roman remains.

In the arrondissement of Briançon, the chief town is Briançon, a fortification of the first class, on the right bank of the Durance. The town is defended by seven forts, built on heights of different elevations above the town: five of these are on the left of the chasm at the bottom of which the Durance flows, and communicate with the town by means of a bridge, consisting of a single arch, 129 feet in span, and 168 feet above the water, and with each other by passages cut within the solid rock. Briançon is considered one of the strongest towns in the world; and the Fort D'Infernet, which is 8143 feet above the level of the sea, is the highest fortress, and, with the exception of the hospice of the Great St. Bernard, the highest place constantly inhabited in Europe. In the town, which has a population of 3455, there is a tribunal of first instance and a college: nails, scythes, pencils, hosiery, bonnets, cotton, and leather are made, and the chief trade is in these, together with wool, talc, and lavender-water. The other towns are—Aiguilles, on the Guil, which is the centre of a large cheese dis-

trict: Lagrave-en-Oysans, on the route from Grenoble to Turin, population 1500: L'Argentière, on the Gironde, near which are lead-mines and slate quarries: Monestier, on the left bank of the Guisane, which has a population of 2500, some manufactures of cotton and linen, and hot sulphureous springs; the snow lies here for eight months in the year, and there is a huge glacier near the town: and Veran-la-Ville, near which tinted marble of great beauty is found.

In the arrondissement of Embrun, the chief town is Embrun, the Ebrodunum of the Romans; population 3138. The town, which is small, but fortified by ramparts and defended by a strong citadel, was formerly the seat of an archbishop. It stands on the platform of a lofty rock, on the right bank of the Durance, has a tribunal of first instance, and a college. The ancient cathedral, said to have been founded by Charlemagne, and the bishop's palace, are the most remarkable buildings. Broadcloth, ribands, leather, and hats are the chief manufactures; in the neighbourhood there are slate and marble quarries, and a 'rocking stone' of vast size, which the least effort puts into a state of oscillation. The other towns are—Chorges, which takes its name from the ancient Caturiges; population 2009; the parish church was formerly a Roman temple of Diana: Guillestre, near the left bank of the Guil, which has an iron-foundry and some manufactures of cloth: Orcières, on the Drac, which is famous for its butter and cheese; it has also a good trade in wool: Savines, on the right of the Durance, near which are quarries of black marble; population 1000: and Mont Dauphin, which stands on a steep hill near the confluence of the Guil and the Durance; this town was fortified by Vauban in 1693, and commands the valleys of Embrun, Briançon, and Queyras.

The department returns two members to the Chamber of Deputies, forms the diocese of Gap, is comprised in the jurisdiction of the Cour Royal and of the University Academy of Grenoble, and belongs to the seventh military division, of which Lyon is head-quarters.

(*Géographie Universelle;* Balbi, *Géographie.*)

ALPHABET, is the name given to the series of letters used in different countries at different times. The term is borrowed from the Greek language, in which *alpha, beta,* are the first two letters; or if we go a step farther back, we should derive the word from the Hebrew, which gives to the corresponding letters the names *aleph, beth.* Thus the formation of the word is precisely analogous to that of our familiar expression, the *A, B, C.*

Among the different causes which have promoted the civilization of man, there is none, we might almost say, which has been so fruitful as the invention of the alphabet; and the very circumstance of the invention being essential to this effect, and therefore preceding it, has made it a task of some difficulty to point out the mode in which the discovery was made. The present age however has nearly surmounted this difficulty, and we begin to see pretty clearly at least how the discovery *might* have been made, perhaps how it actually was made. Oral language itself, we might almost infer *à priori,* originated in an attempt to imitate by the organs of the human voice those different sounds, which nature, in her animate and inanimate forms, is constantly presenting to our ears. By his powers of articulation man could imitate those sounds at pleasure, and thus recall to the minds of those around him the notion of absent objects and past actions with which the sounds were connected. Thus, in its various forms and combinations, the single principle of *sound* would afford a vast number of symbols which might be made to represent at first the material objects of nature, or the action of those objects upon one another. The transference of these signs from particular objects that make an impression on the *ear* to the expression of abstract qualities, would be governed by the same principles of association. That such must have been the origin of spoken language, reason would seem to point out, and the historical investigation of the subject strongly confirms the theory. On the other hand, the language which takes the *eye* for its channel of communication with the mind, would in its first steps be more direct and more simple. The objects of nature and many of the external relations between them are easily represented to the eye with more or less rudeness by a stick upon sand, and by many other means of graphic imitation which even the savage may command. Yet when we compare these two modes of language with one another, we soon perceive that *sound* is a more convenient medium of ordinary communication, if it be only for the reason that the voice is ever with us, and that the ear is ready to receive impressions from every direction, above, below, and around us. But while the language of pictorial symbols is more easily invented and understood at first, the other, when once invented and understood, is better adapted for the ordinary uses of life. The difficulty of invention, however, is a difficulty that occurs but once; the difficulties in the after-use of the language, such as they are, never cease.

But the time would soon come when it would be desirable to record for a shorter or longer time the acts and thoughts, and commands and duties of man; and here the language of the voice would utterly fail, while the other might ensure a continuance of existence, depending upon the nature of the material on which the representation might be made. In less than a second the sound of the human voice dies away, but the picture even on the sea-sand lasts until the next tide washes it away; the waxen tablet would preserve its characters long enough for the purposes of epistolary communication; the papyrus, the cloth of linen and cotton, the bark of trees, the harder woods, the skins of animals, would retain the impressions upon them for centuries; and lastly, bricks, and stone, and metal, under favourable circumstances, might convey their records to a posterity of many thousand years. Now to represent visible actions and visible objects would, as we have already stated, be an easy affair, and the signs for abstract qualities might be obtained, as in sounds, upon the principle of association. But instead of form-

ing a new series of associations, which would not easily become generally intelligible, it would no doubt be found more convenient occasionally to turn to account the already existing language of sound. A few examples may perhaps explain our meaning. Visible objects in the first place may be directly represented. No arbitrary symbol of an *ox* can so readily convey that notion to the mind as the representation of the animal itself, or, in order to save time, that part of the animal which is most characteristic of it, as the head with its horns. To signify a visible action, such as *fighting*, we should perhaps avail ourselves of the *fist*, as the natural organ for that purpose belonging to man, following therein the same direct principle of association which has formed the Latin word *pugnare*, to fight, from the element *pugnus*, or rather *pug*, a fist. In this way we should form a series of symbols altogether independent of the language of sound; but, we repeat, it would often be more convenient to make the language of visible signs in part dependent upon the oral symbols. This may be most simply effected by what is in fact a species of punning. If, for instance, a symbol were required of an Englishman for the abstract notion of *friendship*, he might employ the two separate signs for a *friend* and a *ship*; the first of which we will suppose to be *two hands clasped*, the other of course *a hull with a mast* and enough *rigging* to distinguish it from other objects. We should thus have two pictorial symbols, which would separately excite in the mind first the *notions*, and then the oral names of *friend* and *ship*, and the combinations of these sounds would recall that new notion, for which the articulate sounds of the word *friendship* are already the conventional symbol.

So far we have only considered what the origin of written language might have been. The records still existing of the Egyptians have enabled modern discoverers to deduce, with an evidence closely approaching to certainty, what it actually was. The hieroglyphic characters of Egypt bear upon the very face of them decided proof that they are in their origin pictorial emblems; and that they constitute a language appears incontrovertibly from the triple Rosetta inscription, the Greek version of which expressly affirms that the decree contained in the inscription was ordered to be written in three different characters. The subject, however, of Egyptian writing in its different forms requires an investigation of so many details, that we must here be satisfied with stating what appears to be a safe conclusion, that a language originally hieroglyphic would naturally wear away until the characters lost nearly all trace of their original formation, and became mere symbols of phonetic power, first perhaps as syllables, afterwards as simple letters.

The Hebrew alphabet again affords evidence of the same nature, inasmuch as the names of the letters are also the names of material objects, and the symbols too, when closely examined, are, some at least, rough pictures of those objects. But when we speak of the symbols, we must recollect that the characters now current under the name of the Hebrew alphabet, are of later date than those called Phenician and Samaritan, specimens of which may be seen in Plate I., Nos. 2, 3, 4, 5. The first two are taken from Boeckh's 'Inscriptions,' pp. 523, 527, and from the coins given by Mionnet; the Samaritan characters are copied solely from Mionnet. But we may go even higher, for the Greek alphabet, and the Etruscan (which notwithstanding its independent name is a mere offset from the Greek) generally present a still more accurate picture of the original letters, as might be expected from the two considerations, that the inscriptions in the Greek tongue are of an older date than any Phenician inscriptions or Samaritan coins, and according to the express testimony of Herodotus (v. 58), founded on personal examination, the Ionians received their characters from the Phenicians, and actually called them Phenician. Now the first letter in these alphabets, *aleph*, it is well known, means *an ox;* indeed, the terms ἐλίφας, *elephas, elephant*, of the Greek, Latin, and English languages, seem to be derived from this Hebrew name. If in Syria the name *aleph* was extended to the *elephant*, just as the Greeks applied their term *crocodile*, properly a *lizard*, to the monster of the Nile—when the word came to the western nations in connection with the *elephant*, the original sense would be readily lost in the secondary. The Romans too called the same animal *Bos Lucas*, the *Lucanian Ox*. We have already stated that the most simple mode of representing an ox would be by a picture of its head and horns, and such is seen in the second Phenician character. Those who are determined to take nothing for a representative of an ox that has not a body, four legs, and a tail, may be asked to account for the astronomical figure of *taurus* in the zodiac.

Again the Hebrew name for the letter *m* was *mem*, and this also was the name for water. Now a very ordinary symbol for water is a zigzag line, which is no doubt intended to imitate undulation or rippling. We find this symbol for *aquarius* in the zodiac, and we find it also in Greek manuscripts, both for θαλασσα the sea, and ὑδωρ water, the former word having the symbol inclosed in a large circle or *theta*, the latter having its aspirate duly placed above the waving line. Indeed every boy, in his first attempt to depict water, represents it by a zigzag line. Now, if we turn to the oldest Greek character for this letter, we find a mere wave, the initial or concluding stroke of which becoming by a kind of flourish longer than the others, leads to the so-called Etruscan and Greek forms in columns 6, 9, 14, 15, 16, 18. This long descending stroke takes a bend in the Samaritan and Hebrew characters towards the left; as was not unnatural in a language where the words run in that direction. By a comparison of the Hebrew *gimel*, *nun*, *ayin*, and *pe*, and perhaps *caph*, with the corresponding letters in the other alphabets, the reader will perhaps be induced to ascribe the bottom strokes, which in these letters also run to the left, to the same accidental origin. This supposition is strongly confirmed by the fact that the *caph*, *nun*, *pe*, and *tsadi*, when they are the final letters of a word,

omit this appendage, and in its place have the perpendicular stroke merely continued in the same direction downwards a little beyond its usual length.

Our last example shall be from *ayin*, which is at once the name of a letter and the word which signifies an *eye*. The eye happens moreover to be a hieroglyphic character of the Egyptians, and therefore we cannot be surprised to find it among the Hebrew symbols. Nay, if we may believe Champollion, the picture of an *eye* in the Egyptian hieroglyphics was actually used at times for an *o*, exactly as *ayin* by the Hebrews. Such a character is actually found in our Greek series of alphabets, Plate II., column 21, &c.

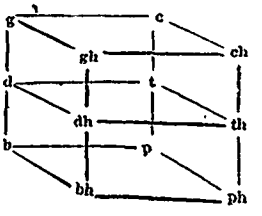
We will now consider the distribution of articulate sounds among the vowels, liquids, and consonants. Attempts have been made by some writers to determine the number of distinct sounds which the human voice is capable of producing. A little consideration would have shown them that they were attempting to limit that which was essentially infinite. The vowel sounds all run one into another by a continuous gradation. The same is true of those modifications of sound which we call consonants, and likewise of the liquids. At the same time it is of course necessary that a limited number of symbols should be employed. Of these some nations employ more, some less, but few have ever made use of so many as thirty; unless indeed we include those alphabets which consist of syllabic symbols, and then, of course, the consonantal syllables will be multiplied in the proportion of the simple vowels.

The vowel sounds are usually placed in the order, *a, e, i, o, u*, such being their succession in the various alphabets of Europe and Western Asia; but if we wish to place them in that order which marks their relation to one another, we should write *i, e, a, o, u*, or in the opposite order, *u, o, a, e, i*. Mr. Willis, in a paper in the 'Cambridge Philosophical Transactions' (vol. iii. 231), has shown by experiment, that the different vowel sounds may be produced artificially, by throwing a current of air upon a reed in a pipe, and that, as the pipe is lengthened or shortened, the vowels are successively produced in the order above given. When a door creaks, or a cat squeals, we have experiments of the same nature, at least as regards the result, for in both these cases we may often detect the duo series of the vowels. Thus, the word *mew* would be more expressively written *mieaou*. In all these remarks we speak of the vowels as possessing those sounds which are common on the continent, not those which are peculiar to ourselves; viz. *i* like *ee*, *e* like *ay*, *a* as in *father*, *o* as in *bone*, *u* as *oo* in *food*. The liquids again should be written in the order *r, l, n, m*, beginning from the throat and advancing along the palate and teeth to the lips; or in the reverse order.

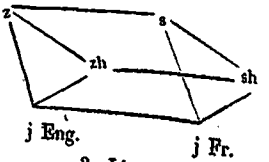
The other letters have often been divided according to their organs: 1st, the guttural and palatals, *g* (as before *a*), *k* (with *c, q*); *gh, ch* (as in the Scotch *loch*); *h*, with perhaps *ng, y*, and *wh*. 2ndly, dentals, *d, t; dh* (as *th* in *this*), *th* (as in *thing*); *z, s; zh* (like *ch* in *church*), *sh; j* (as in English), *j* (as in French). 3rdly, labials, *b, p; v, f*, and *w*. Perhaps the last four of those which we have included among the dentals partake in an equal degree of the palatal character. In the above enumeration of the consonants, we have placed first in their respective series those commonly called the middle (or medial) letters *g, d, b*; then the *tenues*, or more delicate letters *k, t, p*; and then the aspirates; but as each class presents two forms of the aspirate readily distinguished by the ear, and as these pairs of aspirates stand in the same relation to one another as the *medial* and *tenues*, we have throughout placed what we may perhaps call the middle aspirate before its delicate relative, viz. *gh* before *ch* or *χ*; *dh* before *th*; *v* before *f*. Perhaps among the labials, *v, f, w* may be considered as aspirates: if so they are still in their proper order. So among the six sibilants given after the dentals, it appears to us that *z, ch*, and the English *j*, stand respectively to *s, sh*, and the French *j*, in the same relation of *medials* to *tenues*, and they are arranged accordingly. The letters *y* and *w* are *sui generis*, and are indeed intimately related to the vowels, having an affinity to the opposite extremities of the vocal series, *y* to *i*, *w* to *u*; and thus we may consider the commencement of the series as connected with the throat, and the termination with the lips.

A tabular arrangement, in which the *medial*, *tenues*, and *aspirated* letters are placed in vertical columns, while those belonging to the same organ are collected in horizontal rows, affords a good view of them. But the parallelepipedon furnishes an arrangement superior to that of the square for the twelve related consonants given below; and for the sibilants, the angular points of the prism may be employed: while the vowels and liquids require nothing more than a simple line.

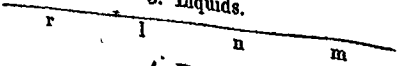
1. Consonants.



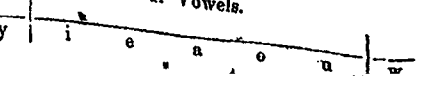
2. Sibilants.



3. Liquids.



4. Vowels.



In the preceding parallelepipedon, the three horizontal planes, beginning from above, represent the guttural or palatal, the dental, and the labial letters. The front vertical plane includes the aspirates, that at the back, the non-aspirates. The left vertical comprehends the medial letters, that on the right the *tenues*. Every letter is, of course, at the intersection of three of these planes, and may be defined accordingly.

A distribution of the letters according to the actual nature of the sounds is of considerable use in the examination of those numerous euphonic and dialectic changes which occur not only in the polished language of Greece, but also in those languages which are inconsiderately called barbarous. But no single distribution will at once present to the view all the relations of the different letters. Not merely are the several letters in each of our horizontal, and to a certain extent also in the vertical divisions, interchangeable with their neighbours, but the twelve consonants arranged in No. 1, are in fact also related to the liquids, and even to the vowels. As these consonants extend from the throat to the lips, so do the liquids, and the vowels also, *y* and *i* being formed in the back of the mouth, *u* and *w* at the lips. In fact, the principle of lengthening the vocal pipe, which gave Mr. Willis the series of vowel sounds, is nothing more than what is done in the human mouth. To produce the first sound, we shorten the tube of the mouth; for the last, we extend it to its utmost length; and in intermediate degrees for the vowels between the two extremes. In comparing therefore our ordinary consonants with the liquids and vowels, we find, as we might expect, *g* closely related to *y*, as our language in its older forms, and even its existing dialects, fully establishes. The intermediate *d* again has an affinity for *l*, *n*; and *b*, at the labial extremity of the consonants, is intimately related to *m*, *w*, and *u*, at the corresponding points of the other series. To make our views include the whole body of letters, it remains to be observed, in the first place, that had the nasal organ been considered, we should have had a series, *m*, *n*, *ng* with their intermediate sounds, depending partly upon the nose, and partly upon the lips, teeth, and palate, respectively. In the Sanscrit alphabet, the series of guttural, palatal, lingual, dental, and labial consonants, have an *n* belonging to each class with a distinct symbol. That which belongs to the guttural series is a sound analogous to our *ng* in *ringing*. The nasal of the labial series is of course *m*. The other omission of our tabular view is the letter *h*, which, when pronounced at all, is a faint representative of the guttural aspirate *ch*.

Having endeavoured to arrange the letters of the alphabet upon some principle, we cannot pass over in silence the apparent confusion in the alphabets we have been speaking of, the Hebrew and Greek. That the order observed in the latter is borrowed from the former can scarcely admit of a question. For though the *vau* of the Hebrew has no corresponding character in the later Greek alphabet, it is yet well known that it once had such a correlative in the *digamma*, at least in

power; and that the digamma was actually lost from the sixth place is proved from the gap at that point in the numerical use of the Greek alphabet, and the clumsy contrivance of filling it up by the letter ϛ. The position of the letter F in the Roman alphabet is a proof in confirmation. The *tsadi* of the Hebrews can never have had a place in the Greek alphabet, but the following letter *koppa* most assuredly had, as is proved both by the existence of that letter in many of the older Greek inscriptions, and the coins of Croton, and no less decidedly by the insertion, as before, of a numerical substitute, which even retained the name of *koppa*. It may be observed too, that the Latin *q*, of the same power and form, corresponds also in position; and the close connection between *koppa* and *q* is further confirmed by the fact that, as *q* is generally used solely before *u*, so *koppa* is rarely used except before *o*, as in the coins of Cos, Corinth, and Syracuse. The *schin* and *sin* of the Hebrew have in their own alphabet not merely an identity of form, except in the diacritic points, but bear also the same numerical value, so that they must be considered as one in their origin. At *tau* the Hebrew series terminates, while the Greek adds first a *υ*, then a *φ*, a *χ*, a *ψ*, and an *ω*. That some of these did not belong to the early Greek alphabet is proved historically. The *ω* appears rarely before the year 403 B.C.; *ψ* was represented by ΦΣ, and *υ* or Υ appears to be only a variety of the *ayin*, to which it bears a strong resemblance in form. The letters *o* and *u* moreover in all languages are so closely related in power, that the one might almost supply the place of the other, as is actually the case in the Etruscan, which had a *u*, but no *o*. It is not, therefore, a very bold thing to assert that the early Greek alphabet terminated at the same point as the Hebrew. There is, however, a difficulty which should not be neglected. It has been a common assertion, that the old Greek alphabet consisted of only sixteen letters. But Pliny and Plutarch seem, in the first place, to be the sole authority for the statement: and the assertion of the former, that Palamedes in the time of the Trojan war added Θ, Ξ, Φ, Χ, and Simonides Ζ, Η, Ψ, Ω, is full of so many difficulties that belief could not readily be given to him, even were there no counter authority. For upon what principle could the Greek letters have attained their present order, if they were introduced according to the chronological arrangement given by Pliny! But fortunately in the very passage referred to (vii. 56, or 57), Pliny gives another statement from Aristotle, different from his own in several particulars, but it must be confessed not more satisfactory. They mutually serve, however, to weaken the authority of each other. In enumerating the sixteen letters it may be observed, that the long vowels Η, Ω, the double letters Ζ, Ξ, Ψ, the aspirates Φ, Χ, Θ, are excluded by Pliny. In defence of Ω, Ψ, Χ, Φ, we say nothing; but the character Η certainly did exist, not indeed as a long vowel, but as an aspirate. Thus with the *digamma*, the letter Η (*cheth*), and the *theta*, the old alphabet possessed

a complete trio of aspirates: so erroneous is the notion that they should all be excluded. Lastly, for Z and Ξ, the circumstance of their situation corresponding precisely to the *zain* and *samech* of the Hebrew would induce us to defend them, even at the risk of supposing (if such supposition be necessary) that, in their original power, they were not double letters. We do not, however, mean that the very characters existed, but that sibilants of some kind occupied their places. The precise correspondence of the Greek and Hebrew alphabets in the order and power and names of the letters is an argument of much stronger weight than any testimony from such careless and late writers as Pliny and Plutarch.

But we are digressing too long from the question about the principle which governed the first arrangement of the Hebrew or old Greek alphabet, if principle there be. Though we cannot satisfactorily account for the whole order throughout the twenty-two letters, there are certainly traces of some regularity in the arrangement. We find first the simplest of the vowel sounds followed by the three medials, *β*, *γ*, *δ*; then another vowel, followed, with some irregularity indeed, by aspirates corresponding in order to the above *consonants*, *vau*, *cheth*, *theth*, no bad representatives of *φ*, *χ*, *θ*. Then again we have a vowel *ι*, followed soon after by three consonants related to each other, *λ*, *μ*, *ν*. Soon after we find a fourth vowel *ο*, and after it, with a little interruption it must be allowed, *pi*, *koppa*, *tau*. It cannot well be a mere accident that the several classes of labials, palatals, and dentals occur so nearly together in the different parts of the series, and always in the same order. It will perhaps here be observed, that in these remarks we are unintentionally confirming the assertion of Pliny and Plutarch about the sixteen letters, the more so as Plutarch speaks of four quaternions. The objection to such an explanation of their statements is to be found in the difficulty of imagining a language to exist without a sibilant; otherwise the absence of an *r* might readily be supplied by *l*, as is actually the case in some languages. As for the sibilant, however, the *th* might possibly represent that sound.

The accompanying plates require a few remarks in addition to what has been already said. The first plate contains alphabets running from the right to the left, a practice which seems to have been earlier than that which is now generally adopted. Herodotus tells us (ii. 36) that such was the practice of the Egyptians, and his assertion is confirmed by a considerable number of the existing inscriptions, among which however some are found running in the opposite direction, and still more are arranged vertically. The Etruscans, it is well known, turned their letters to the left, and there even exist specimens of Latin inscriptions, with the same peculiarity. Among the Greeks, there were four modes of writing, one vertical (*κιονηδὸν* or *column-wise*), which arrangement however does not affect the relative position of the letters among themselves; and three horizontal, *viz.* one with the words running to the left; another, which soon prevailed over the rest, turned towards the right; and a third, in which the direction of the lines alternated, as in the course of a plough, from which idea inscriptions of this kind are said to be written *βουστροφηδὸν*, or *ox-turning-wise*. This last method must have been much more convenient than our present broad sheet of letter-press, in which the eye, on arriving at the end of a line, requires a nice perception of a straight line to hit the new commencing point. The second and third plates give numerous specimens of the Greek alphabet, which are taken chiefly from Boeckh's great work published at Berlin, and the numbers written after the titles at the head of each column refer to the order of the inscription in that work.

The several inscriptions which have furnished these Greek alphabets exist in the following forms:—

No. 14, in two flutings of a Doric column brought from the island of Melos, now in the Nanian Museum; but this inscription is open to suspicion.—No. 15, on a bronze tablet found in 1783 in Italy near Petilia, north of Policastro; it is in the Borgian Museum at Naples.—No. 16, on a vase discovered in a sepulchre near Corinth. (See Dodwell, ii. 196.)—No. 17, on a votive helmet found in the Alpheius.—Nos. 18, 19, on a marble, now in the British Museum, No. 199.—No. 20, on a square marble base, near a temple of Apollo, in the island of Delos. (See Tournefort's 'Travels,' t. i. ep. vii., p. 360.)—No. 21, on a bronze tablet dug up at Olympia, and brought away by Gell in 1813.—No. 22, on a bronze helmet found in 1817 in the ruins of Olympia, in the possession of Col. Ross.—Nos. 23, 24, found at Delphi. (See Dodwell, ii. 509.)—No. 25, on a small votive helmet found near Olympia, in the possession of Col. Leake.—Nos. 27, 28, part of a hymn to Bacchus inscribed on an altar, which contains also a representation of a procession in honour of the god, in the Pembroke Museum at Wilton.—No. 29, from an epitaph in elegiac verse on those who fell in the first battle before Potidæa, B.C. 432. (Thucydides, i. 62.) It was found in the plain of the Academy near Athens, and is now in the British Museum, No. 290.—No. 30. The alphabet here given is that which came generally into use at Athens after the archonship of Euclides, 403 B.C. Specimens may be seen in the Elgin Marbles of the British Museum, for instance in No. 305, the date of which is said to be 398 B.C.—The column No. 26 is from Mazocchi's folio on the Heraclean tablet.—The 'Codex Alexandrinus,' No. 36, is in the British Museum.

Of the Roman alphabets given in Plate IV. the first is from the fac-simile of the Bacchanalian inscription given by Drakenborch in the seventh volume of his 'Livy;' the date of which is fixed at 186 B.C., by the names of the consuls given in the decree. This inscription is in the Cæsarean Museum at Vienna. The second and third columns are from an inscription given by Maffei, in his 'Istoria Diplomatica,' p. 38, and here the date is fixed to the year 27 A.D., in the reign of Tiberius, by the names of the consuls, M. Crassus Frugi, L. Calpurnius Piso. Column 4 is from the same work of Maffei, p. 31, and belongs to the year 68

or 69, as is determined by the mention of the Emperor Galba. Both these inscriptions are of very coarse execution. The characters of the Medicean MS. of Virgil, preserved at Florence, are taken from Burmann's engraved specimen, in the first volume of his edition of that author, p. xxxvi. of the Preface. The remaining alphabets of that plate are from Astle's 'Origin of Writing.'

PLATE I.—ALPHABETS FROM RIGHT TO LEFT.

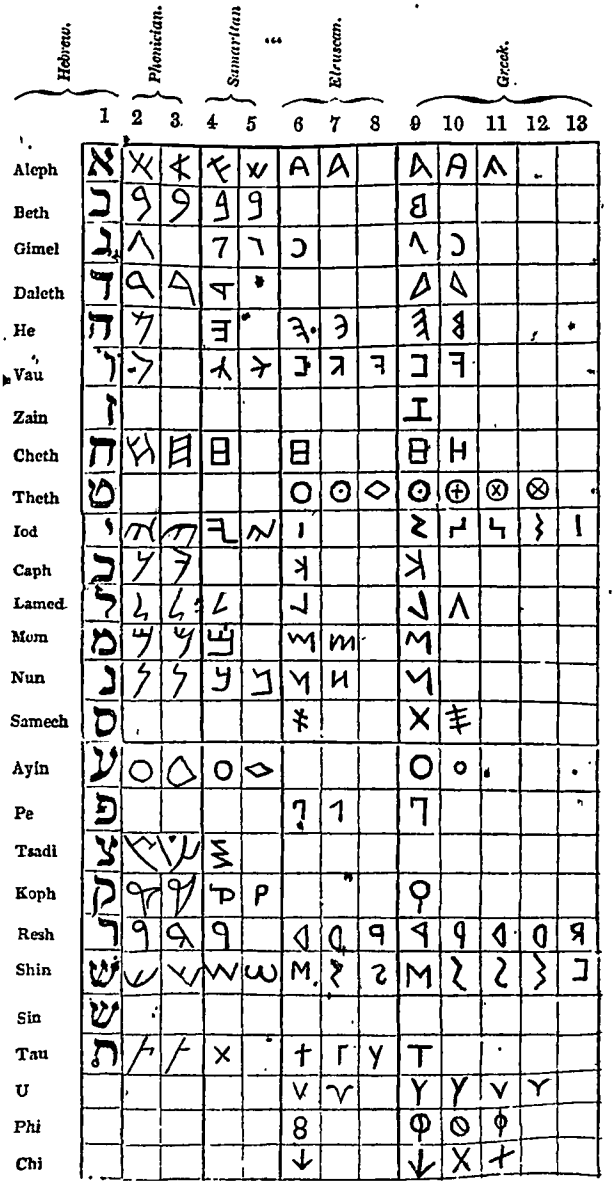


PLATE II.—GREEK ALPHABETS.

Nandan column, 3.	Tessera, 4.	Vase, 7.	Helmet, 30.	Louvre Sigean, 6.		Delian vase, 10.	Elean tablet, 11.	Helmet, 16.	Delphic Inscr. 25.		Helmet, 31.	Heraclean tablet.
14	15	16	17	18	19	20	21	22	23	24	25	26

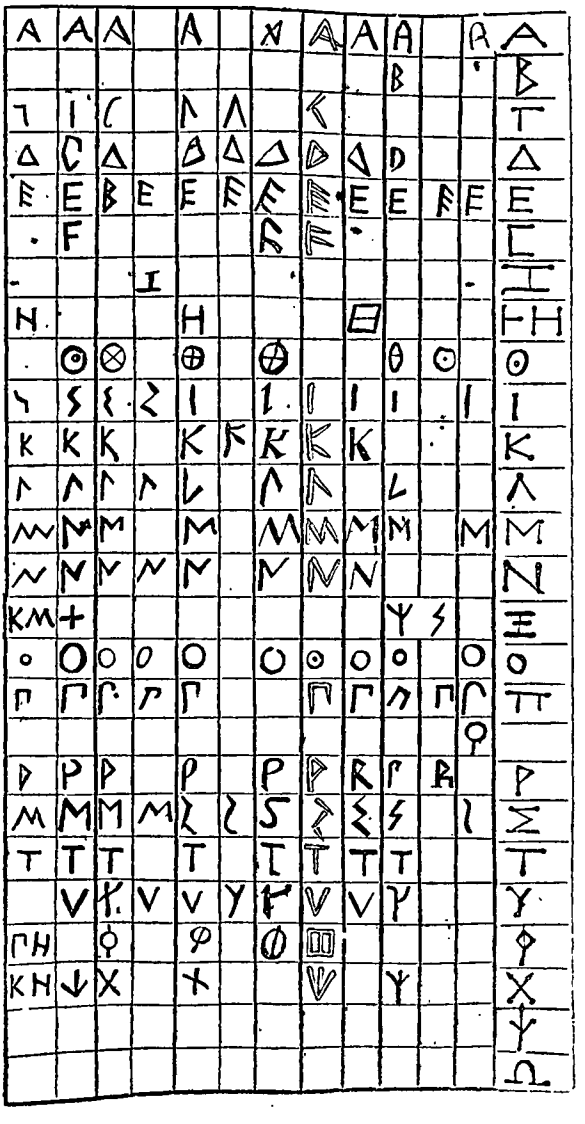


PLATE III.—GREEK ALPHABETS—*continued.*

Altar to Bacchus, 38.		Po'idæan Epitaph, 170.	After 403 B.C.	Various.					Codex Alexandrinus.	Early Printing.	
27	28	29	30	31	32	33	34	35	36	37	38
Α		Α	Α	Α	Α	Α	Α	Α	Α	α	
Β			Β						Β	β	β
Γ		Λ	Γ						Γ	γ	γ
Δ		Δ	Δ	Δ	Δ	Δ			Δ	δ	
Ε		Ε	Ε	Ε	Ε	Ε	Ε	Ε	Ε	ε	
			Ι		Ζ				Ζ	ζ	ζ
		Η	Η	Η	Η	Η			Η	η	
Θ		Θ	Θ						Θ	θ	θ
Ι		Ι	Ι						Ι	ι	
Κ		Κ	Κ		Κ				Κ	κ	κ
Λ	Λ	Λ	Λ	Λ	Λ	Λ			Λ	λ	
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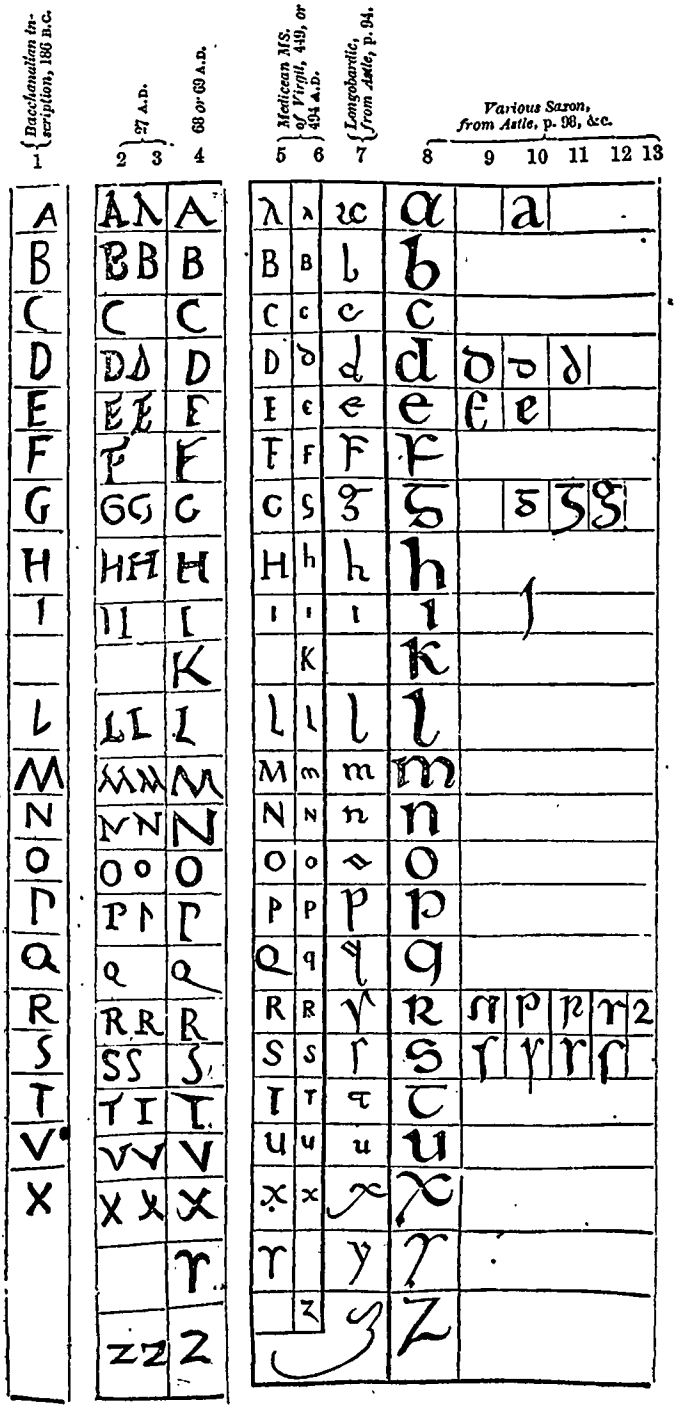
PLATE IV.—ROMAN LETTERS.


1 Bacchanalian inscription, 186 B.C.
2 3 27 A.D.
4 68 or 69 A.D.
5 6 Medicean MS. of Virgil, 449, or 494 A.D.
7 Longobardic, from Astle, p. 94.
8 9 10 11 12 13 Various Saxon, from Astle, p. 98, &c.
A B C D E F G H I K L M N O P Q R S T V X Z
Additional Saxon Letters.
dh; th; w.

ALPHEIUS, one of the chief rivers of Peloponnésus (Morea), which rises in Arcadia, and flows through Elis, past Olympia, to the sea, receiving in its course the rivers Helisson, Ladon, Erymanthus, Cládeus, as they were called by the Greeks, and numerous smaller streams. It is now called Rofea, up to its junction with the Ladon; and above that the river of Karitena. It drains a large mountain district, bounded by Mount Erymanthus on the north, the central ridge of Arcadia on the east, and the mountains of Laconia and Messenia on the south. Not far from its source, and near a place called Symbola (the 'meeting of the waters'), the Alpheius (says Pausanias, viii. 44, 54) is joined by a stream, and sinks under ground; it rises again five stadia from Asea, close to the fountain of the Eurótas. The two rivers then mix their waters, and, after flowing twenty stadia, are again swallowed up, and re-appear,—the Eurotas in Laconia, the Alpheius at Pegæ (the Springs), in the territory of Megalópolis, and in Arcadia. The statement of Pausanias is, to some extent at least, confirmed, and the course of the upper stream (now the Saranda-pótamo) traced by Colonel Leake ('Travels in Morea,' vol. i. p. 121), to the spot where it first enters the earth. These subterranean descents of streams are not uncommon in the Arcadian rivers, and are called by the modern Greeks *Katavothra*.

This river is celebrated in ancient song, and several mythological stories are connected with it.

ALPS, the name of a large mountain system in southern Europe, which is generally supposed to derive this appellation from a Celtic word, *Alb*, or *Alp*, signifying 'white.' The geographical features will be noticed first; and then the geological formation.

1. *Geographical Description.* — The Alpine system, in its full geographical extent, may be considered as connected with the chain of mountains that runs through the Italian peninsula; and the point of its junction with the Apennines cannot therefore be accurately determined. Some fix the commencement of the Alps at the depression of the Valley of Savona, and others at Capo delle Melle on the Gulf of Genoa. Assuming it to commence at this cape, its course is first W., then N.N.W., next N., then N.N.E., and gradually bends round towards the head of the Gulf of Venice; so that the chain of the Alps generally presents a concave line towards Italy. The minor chains, branches, and offsets, are very numerous; but these are described under the heads of the countries to which they belong. The main line of the Alps here described, commencing at the Gulf of Genoa, and ending at the Great Glockner, eastward of the Tyrol, is grouped into portions known by six different names, the *Maritime*, the *Cottian*, the *Graian*, the *Pennine*, the *Helvetian*, and the *Rhætian* Alps. These collectively, with the branch from the Glockner towards Venice, form an unbroken range which cannot be avoided by any détour in passing out of Italy to France, Savoy, Switzerland, the Tyrol, or Germany.

The geographical position of the main mass of the Alps is remarkable as lying about midway between the equator and the North Pole: the following positions and elevations, between Monte Viso and the Grand Glockner, are all included within this main mass.

Names.	Lat.	Long.	Height in Eng. ft.
Monte Viso	44° 40′	7° 5′	12,582
Mont Genèvre			11,781
Mont Cenis			11,457
Mont Iséran	45° 30′	7° 16′	13,267
Mont Blanc	45° 50′	6° 51′	15,782
Mont Cervin		7° 43′	14,835
Monte Rosa	45° 56′	7° 52′	15,150
Mont Gothard			12,000
Gallenstock	46° 37′	8° 24′	12,477
Vogel Berg, or Piz Valrhein	46° 29′		10,866
Ortler Spitz	46° 28′	10° 32′	12,852
Gebatsch			12,276
Grand Glockner	47° 7′	12° 43′	12,776

The great valleys of the Alps, such as those of the Rhone, the Inn, and the Drave, lie nearly in the direction of the main chain. The transverse valleys are much shorter, and, on the Italian side, often end in lakes, such as lakes Maggiore, Como, &c. The slope of the Alps on the Italian side is in almost every part steeper than on the opposite side; so that the lakes and valleys on the northern side are much higher than those towards Italy. The width of the Alpine chain varies from a few miles to 150 miles, and can in no part be estimated with much exactness.

The Maritime Alps extend from the Gulf of Genoa to Monte Viso, a distance of about 100 miles. The only carriage-road across them is by the Col de Tende, at an elevation of 5887 feet, formed by Napoleon. There are three or four smaller roads practicable for mules. From this range flow the rivers Gesso, Stura, Maira, Vraita, Po, Roya, Var, and Ubaye. Monte Viso, which terminates this division, is one of the most splendid mountains in the chain; wherever the line of the Alps can be seen from the basin of the Po, this fine mountain is distinguished.

The Cottian Alps extend from Monte Viso to Mont Cénis, a distance of about 60 miles. This division is not very remarkable; no celebrated mountain occurs in it, and the rivers are small. The carriage-road of Mont Genèvre, formed by Napoleon, is the chief pass, leading from the valley of the Durance in France to Susa in Piedmont.

The Graian Alps extend from Mont Cénis to the Col de la Seigne, about 60 miles. This group includes Mont Cénis, one of the best known of the Alpine passes. This pass was only a mule-road till 1803, when Napoleon commenced a magnificent carriage-road, which crosses the chain at a height of 6773 feet. The pass of the Little St. Bernard, which is supposed to be that by which Hannibal entered Italy, crosses the Graian Alps to the Val d'Aosta. Two or three other passes cross the range, and several small rivers spring from it.

The Pennine Alps, extending about 60 miles from Mont Blanc to the Simplon, include Mont

Blanc, Monte Rosa, and Mont Cervin, the three loftiest peaks in Europe. On each side of Mont Blanc are cols or passes of the mountains, usually traversed by pedestrians in their tours about Mont Blanc. There are three larger passes, however, viz. the *Great St. Bernard*, with a Hospice at the height of 7963 feet above the level of the sea; the *Cervin*, at a height of 11,096 feet; and the *Simplon*, the pass of which, at an altitude of 6578 feet, is one of Napoleon's most magnificent works.

The Helvetic or Lepontian Alps, extending from the Simplon to Mont St. Gothard, a distance of about 60 miles, is crossed by the pass of St. Gothard, a valuable carriage-road from Switzerland to Italy, which has a summit level 6890 feet high. The Rhine, the Rhone, the Reuss, and many other rivers, have their rise in this chain.

The Rhætian Alps, which extend about 80 miles east from St. Gothard, have many good passes for travellers. One is the Mont St. Bernardin, at an elevation of 6700 feet; another the Splugen; another the Maloya, 8130 feet; another the Stelvio, 9174 feet; and another the Brenner, 4660 feet—all of which connect Tyrol and the Grisons on the north with Lombardy on the south. There are other minor passes; and the range gives rise to the rivers Adige, Brenta, Piave, Aar, Inn, and many others.

The *Noric*, *Julian*, and *Carnic* Alps, bend round from the Tyrol towards the head of the Gulf of Venice, and are crossed by the high road from Salzburg to Venice, and from Vienna to Trieste. In these, as in most other parts of the Alpine chains, the neighbouring governments are vying with or rather aiding each other to add to the number of these carriage-passes. Owing to the great elevation of the mountains, we find the summits of many of them perpetually covered with snow. The point where the snow-line commences must necessarily vary in summer and winter, but even during the hottest summer snow is always found at an elevation varying, according to local circumstances, from 9000 to about 9500 feet. For an account of the icy masses which lie in many of the valleys, we refer to GLACIERS; and under AVALANCHE are noticed the terrible effects of sudden descents of masses of snow from the mountains.

A remarkable feature in the Alps is the occurrence of lakes on or near the crests of the passes. A pass is never over a summit of a mountain, but over the lowest traversable point. In determining the direction of the path or road, a valley is ascended to the source of the stream which flows through it; this will generally be found on or near the ridge or col, between two mountains, whence another stream follows the slope or valley on the other side. To this general rule there are few exceptions: there is scarcely a pass which is not commanded by mountains; and where the ridge or col is wide enough to receive the water which flows from them, and retain it, lakes are formed, the sources of the rivers which flow from the passes: such is the Mont Genèvre, where the Durance towards France, and the Dora Susanna towards Piedmont, flow from almost a common source. The lakes on the Cenis, on the Great St. Bernard, the St. Gothard, the Bernardin, are of the same kind.

Many of the loftiest summits and peaks of the Alps have been attained by adventurous naturalists and travellers, by whom the district is annually visited. Science has gained much by these excursions in the last few years.

Geological Formation.—The Alps exhibit numerous valleys running both parallel and transverse to them, as if there had been cracks and fissures produced by forces acting from beneath. It is now the opinion of geologists (contrary to a former supposition) that the Alps were elevated at different and widely distant periods; for there are parts which exhibit strata broken and tilted up at various angles, with other strata resting quietly on the fractured edges of the former; while the second group, again, at another part, is seen broken and disordered, and a third lying quietly on it. By examinations of this kind, M. Elie de Beaumont has inferred that the range extending from the Vallais into Austria has been in a great measure elevated after the western Alps had assumed their present general direction. The contortions and dislocations of many of the strata have evidently been very violent.

The central ranges of the Alps are, in a great measure though not altogether, composed of gneiss, mica slate, talcose slate, and others of the like character. Gneiss may be considered as very abundant: it constitutes the mass of Mont Blanc, and of several other lofty mountains. Mica slate is also abundant, frequently passing by insensible gradations into talcose slate, and thus offering instructive examples of the mode in which mica and talc are substituted for each other. The mica slates of the Alps, as is the case with mica slates generally, occasionally contain many minerals, among which may be enumerated garnet, staurotide, cyanite, hornblende, tourmaline, and titanite. A less ancient rock is dolomite, which, at St. Gothard, is several hundred feet thick, and contains many minerals.

In the eastern Alps are found strata of the grauwacke series, the lowest portion of the fossiliferous rocks, or those which contain the remains of animals and vegetables. Next in the order of superposition we find sandstones, slates, and conglomerates, often of a red or variegated colour. These rocks have a considerable range through the Alps; and, though by no means constantly present, occur, when they can be observed, above one or other of those previously mentioned, and beneath the great mass of calcareous rocks to be next noticed. Some of these beds have been formed by the wearing away of older rocks. Next occurs an enormous calcareous layer, interspersed with schists and sandstones. In some of the lower beds of this mass many fossil plants are met with. In many parts of this calcareous system, dolomite (a compound of carbonate of lime and carbonate of magnesia, more or less crystalline) constitutes masses of considerable extent and thickness; the stratification often becoming indistinct, and even lost, when the rock becomes highly crystalline.

Above the great calcareous mass of the Alps, a series of beds has been discovered, consisting principally of micaceous sandstones and blue marls; the latter alternate with limestones and calcareous grits. The strata in question are well seen in the valley of Gossau, amid the Alps, S.E. from Salzburg, and have hence received the name of Gossau beds. In these beds nearly a hundred species of organic remains have been found. Next, in the order of superposition, we find strata of great collective thickness, known under the names of Nagelfluh and Molasse, the former being conglomerates, and the latter sandstones. The various beds are entirely composed of fragments of Alpine rocks, ground down by attrition, and varying in size from a man's head to grains of sand. This variation in size shows that the waters which have transported the fragments into their present relative situations must have possessed different degrees of velocity, and that this velocity must often have been considerable, as the fragments moved are large. Beds of lignites are here and there interstratified with the molasse and nagelfluh, and are worked in various places for economical purposes. In them, or in the strata associated with them, the remains of the mastodon, rhinoceros, palæotherium, and anthracotherium, have been detected.

Such are the stratified rocks which compose the mass of the Alps. Although these various strata may thus be described as forming zones parallel to the central axis, patches of them are often thrust up, or rolled over, out of their general lines of bearing, in consequence of the various disturbances to which these mountains have been subjected. The igneous rocks comprise granite, both in masses and in veins traversing gneiss; porphyry, which in the Tyrol has much disturbed the stratified rocks; serpentine; and other varieties.

Scattered on either side of the Alps, and down the principal valleys, are huge blocks of rock, evidently detached from the great central range, and frequently accumulated in considerable numbers. For an account of these see ERRATIC BLOCKS; GLACIERS.

Botany.—The vegetation of the Alps differs in many respects from that of the plains beneath. At the foot of the Alps, for instance, are rich vineyards, and wine is one of the staple products of the country; the forests consist of most of the common European trees. But at the low elevation of 1950 feet the vine is no longer capable of existing; at 1000 feet higher sweet chestnuts disappear; 1000 feet farther, and the oak is unable to maintain itself; at the elevation of 4680 feet, less than one-third of the height of Mont Blanc, the birch, as well as almost every other deciduous tree, ceases, the spruce fir alone attains the height of 5900 feet, after which the growth of all trees is arrested, not by perpetual snow, which does not occur for more than 3000 feet higher, but by the peculiar state of the soil and air. At the line where the spruce fir disappears, the mountains are ornamented by the *Rhododendron ferrugineum*, which covers immense tracts like our English heath and furze; but even this hardy mountaineer cannot ascend beyond 7800 feet.

Changes of a less striking but not less important kind simultaneously occur in the herbage of the Alps. The causes of this difference between the vegetation of the foot and of the summit of the Alps is doubtless owing to several circumstances combined.

Temperature is certainly one of the chief causes of this difference. At the foot of Mont Blanc, the mean temperature of the year is 53° Fahr.; at the height of 6695 feet it is 32°; and between these points, as well as beyond the latter, the temperature of the year is in due proportion. By this plants are essentially affected; and the vine and chestnut, for instance, are probably prevented from growing at greater heights by temperature alone.

Light, again, is an agent to which the peculiar nature of Alpine vegetation is due; for it is under the action of light that plants feed, and the quantity of food they are able to digest is in proportion to the intensity of the light to which they are exposed. Constant darkness during the state of rest is a condition to which Alpine plants are periodically subject: buried in snow, they remain cut off from every ray of light during the whole of the winter, and it is only when the snow melts, and the spring has really commenced, that they again emerge into day. Now light, among other things, is the great stimulator of the vital actions of plants: if applied when they are able to execute their functions it is of the most essential service to them; but if its influence is exercised only at intervals and at unfit seasons, plants are alternately stimulated and checked till their very excitability is itself destroyed, and thus they perish; or they are excited prematurely into growth, and are cut off by succeeding cold.

Humidity of the soil, gentle, but perpetual, never stagnant, but in a constant state of renewal by the melting of the snow, is a circumstance that may be supposed to cause the peculiar appearance of the flora of the Alps. Under such circumstances no drought can be known, and a flood only sweeps over the surface, leaving nothing but its nutriment behind.

ALPUJARRAS, a chain of mountains in Granada, lying between the Mediterranean and the Sierra Nevada. They run between Motril and Almeria: their rapid descent is on the north side; that towards the sea is long and gentle. The highest point of the Alpujarras is about 5600 feet. The mountain country is in general barren, but furnishes some pasture for sheep.

ALRESFORD. [HAMPSHIRE.]

ALSACE, the name of a former province of France, comprehending part of the basin of the Rhine, by which river it is bounded on the east. In ancient times Alsace was peopled by the Rauraci, the Tribocci, and the Nemetes, and passed with the rest of Gaul under the Roman yoke. Upon the rise of the Frankish monarchy, under Clovis, it fell into the hands of that prince; and after his dismembered territories were reunited under Charlemagne, it was included in the empire of that prince. Subsequently, Alsace became part of the German empire, and continued so till 1648, when by the treaty of Munster a considerable

part of it was ceded to France, and nearly the whole of the remainder by the peace of Ryswick, in 1697. The territories of Montbelliard and Mühlhausen have been acquired by France since the revolution. Alsace is now divided into the departments of RHIN BAS and RHIN HAUT. German is still the common language of the country; but French is understood, and in the towns is spoken among the educated classes.

ALSEN, a small island in the Baltic, belonging to Denmark. It lies in the Little Belt, and is about twenty miles long and five broad. The soil is very fertile, and produces grain, fruit, potatoes, rape, and flax. The island is one of the most pleasant in the Baltic, containing some fine woods and small fresh-water lakes, well stocked with fish. The population of Alsen is stated at 15,045. Sonderborg, the chief town, is a place of some antiquity. It has one of the best ports in Denmark, and about 3100 inhabitants.

AL SIRAT, 'The Path,' in the theology of the Mohammedans, is the name of a bridge extending over the abyss of hell, which must be passed by every one in order to enter paradise. It is described as being narrow like the edge of a sword.

ALSTON. [CUMBERLAND.]

ALT, in music (from the Latin *altus*, high), that part of the scale beginning with F, the fifth line in the treble clef, and ending at E, the third leger or additional line above the same clef.

ALTA, in music (Italian, *high*), generally used in addition to the word *ottava*, as *ottava alta*, an octave higher, *più*, more, being by custom omitted.

ALTAI MOUNTAINS is the name given to that extensive range which forms the northern border of the high lands of Upper Asia (a region composed of high table-lands, mountains, and valleys), and which divides them from the low lands that extend northwards to the Arctic Ocean. This mountain range begins on the eastern banks of the River Irtish, 80° E. long., and extends eastwards till it reaches the Sea of Okhotzk, a gulf of the Pacific Ocean. It grows broader as it advances towards the east, where it spreads out into an immense mass in China on the south, and joins the Aldan Mountains on the north. The whole length from east to west is nearly 3000 miles, or with the Aldan range nearly 5000.

The most westerly part of the Altai, lying between 80° and 86° E. long., is a mass of high rocks furrowed by narrow valleys and rapid rivers: it is called the Egtag Altai. Some of the mountains of this part rise to 10,000 feet, but the average is about 5000. The summits are not rugged peaks, but are nearly level plains of considerable extent, diversified with isolated masses of granite, and often covered with snow. The valleys which intersect the mountains commonly take the form of large oblong flat basins, with gradually sloping sides, each basin being followed by another somewhat lower. All the rivers which rise in the Egtag Altai, flow either into the Oby, or into its greatest tributary, the Irtish. A large number unite to form the Biya and the Katunya, and these two unite to form the Oby. The Narym, the Bukhtarma, and the Uba, flow into the Irtish, and the Irtish joins the Oby; so that the latter conveys an immense body of water to the Arctic Ocean, after a course of 2000 miles.

The mountain mass of Egtag Altai, near its centre, is composed of a diversified stratification of jasper, chalcedony, cornelian, slate, and other rocks, lying upon granite. In some places layers of granite have been burst through by porphyry driven up from beneath, and the granite displaced on each side in great confusion. The mineral riches of these mountains consist of gold, silver, copper, and lead. The mines containing them were worked at some remote period, but by whom or when is not known. They were re-opened by the Russians in the last century, and have been since then extensively worked.

Among the vegetable productions of this region are poplars, willows, medlars, privets, whitethorns, and wild roses, on the low banks of the Irtish; and large forests of larch, birch, and other trees, on the slopes of the mountain. The inhabitants use as a substitute for tea the dried leaves of the *Saxifraga crassifolia*. Agriculture is carried on, but not to a great extent, in the valleys. With the exception of mining, the chief occupation of the inhabitants is that of pasturing cattle. The animals found in this range are numerous—comprising bears, elks, stags, wolves, foxes, lynxes, sloths, hares, squirrels, beavers, otters, sables, martens, &c. The rivers contain excellent fish; the low lands swarm with musquitoes at particular seasons.

A long mountain called the Great Altai,' joins the Egtag Altai on the south, and extends to the great desert of Gobi. Eastward of the Egtag range are three ranges, which extend thence to Lake Baikal, called respectively the Sayans Kean, the Tangnu Oöla, and the Ulan-Gom Oöla. These are all parallel, and at a considerable distance apart; so that there are extensive valleys between them. Many rivers, including the Yenesei, have their sources in these valleys and the neighbouring mountains. The botany, zoology, and agriculture of this region are very similar to those of the Egtag range, but the mineral produce is not so valuable.

The three ranges just described terminate on the east in an immense mountain mass, bounded on the south by the great desert of Gobi, and having Lake Baikal imbedded in its centre. These Baikal Mountains give rise to a large number of rivers, of which no fewer than 160 flow into Lake Baikal. This lake, the largest mountain lake in the world, is described under BAIKAL. All the water leaves the lake by one outlet, and forms a river which joins the Yenesei. In the geology of this region, the lower ranges near Irkutzk are covered with a soft, fine, granulated sandstone, running from east to west, and dipping somewhat to the north. It rests on a conglomerate of granite, quartz, and pieces of felspar, united by a fine granulated sandstone, and stratified like the layer above it. But not far from the lake of Baikal it is changed into granite, which on the banks of the lake passes into gneiss. The same formation is observed round the lake,

granite forming the principal base, but often passing into gneiss; and in some places chalk hills rise between the mountains and the bank of the lake; this chalk is commonly of a soft porous nature, and forms capes which stretch far into the lake. On the eastern side of the lake, the granite and gneiss formation extends to the range of the Aldan Mountains, and the direction of its masses is everywhere from east to west. Many parts of the Baikal range show unequivocal signs of volcanic agency. The plants, agricultural produce, and animals of this region are much like those farther westward; but the mineral riches are of a higher degree of value than in the three ranges, comprising, besides gold, silver, and copper, such gems as carnelion, onyx, topaz, and amethyst.

Eastward of the Baikal group is the range called the Stannowoi Khrebet, which extends to the Pacific Ocean at the Sea of Okhotzk. The highest part of this range is near the sea shore. Towards the west and north the mountains descend in terraces and long-extended broad plains, overtopped by a few elevated summits of no great height. Few of them arrive at the line of perpetual snow. The valleys run mostly in the direction of the mountain chain, from south-west to north-east, and are joined together by a few transverse valleys, which carry the waters to the west. But this observation only applies to the southern portion of the range up to the sources of the Indighirka; for from hence to the Cape Tshukotshoi-Noss the mountains in all their length seem to be cut by long transverse valleys. Nearly the whole district between this chain and the Arctic Ocean is occupied by the Aldan Mountains. Among the rivers are the Olekma, the Aldan, the Yana, and the Anadyr. For the fossil zoology of this region, see SIBERIA.

The Altai Mountains are situated between two regions, which by their nature are unfit for agricultural purposes, except in a few isolated places, and which therefore, from time immemorial, have been inhabited by wandering nations who draw their subsistence from herds. The mountains, however, contain many valleys well adapted for agriculture, and there exist some indications that these valleys have once been cultivated, very probably by the same nation that has worked the mines all over the range to a great extent. This nation, which is known under the name of the Tshudes, is not named in history, and has entirely disappeared, though the immense number of ancient tombs found everywhere, but especially on the mountains of Sayansk, evidently prove that this region was once better peopled. The nation probably was destroyed by its Nomadic neighbours, and with it agriculture disappeared from the valleys. But since the two most extensive empires of the world, the Chinese and the Russian, have taken possession of these ranges, and peace has been established in a region which doubtless for many centuries had not enjoyed it, agriculture has again been introduced, and as it would seem with better success by the Chinese than by their more northern neighbours.

(Humboldt, *Fragmens Asiatiques;* Klaproth, *Tableau de l'Asie;* Ritter, *Erdkunde von Asien.;* Murchison, *Geology of Russia;* *Travels*, by Cochrane, Pallas, &c.)

ALTAMU'RA, a town of the kingdom of Naples, in the province of Bari; population 16,000. It is built on a hill at the foot of the Apennines, and has an old castle, and a fine cathedral founded by Frederic II., which is ornamented with pictures. Altamura was taken by storm from the republicans, in 1799. It is a place of considerable trade in the agricultural produce of the country; good wheat is grown in the neighbourhood. Its fairs are well attended. Several Greek and Roman remains have been found in and near the town.

ALTAR (the Latin *altâre*, which signifies an elevated place), an erection to offer sacrifice upon. The first altar mentioned is that set up by Noah, to offer sacrifice when he quitted the ark; and throughout the history of the Jewish patriarchs altars are continually said to have been erected by them, in different places, as circumstances rendered it expedient. But when the Jewish law was given, one altar of burnt-offering, at which alone victims were slain, was made for the whole nation, and the priests, as ministers for the nation, offered sacrifice upon it for all.

We constantly meet in the Bible with the expression of the 'horns of the altar.' One use of them is obvious; victims might be conveniently bound to them. (Psalm cxviii. 27.) But horns were an emblem of power and authority throughout the east; and probably they were also meant to indicate the greatness of him to whom the altar was sacred.

A sort of natural religion seems to have pointed out the tops of hills, and groves, as the fittest spots for altars. The pagan nations which surrounded the Jews were especially addicted to worshipping in high places; and it was hardly possible to prevent the Jews themselves from falling into this habit. 'They also built them high places, and images, and groves, on every high hill, and under every green tree.' (1 Kings xiv. 23.)

The altars of the Greeks were of three sorts: those dedicated to the heavenly gods were often structures of considerable height; those of demigods and heroes were low and near the ground; and those of the infernal deities (if such may be called altars) were trenches sunk in the ground. They may again be divided into three classes, those for burnt offerings, those on which no fire was used, which were meant for offerings of fruit, meal-cakes, &c.; and those on which fire might be used to consume vegetable productions, but no blood was spilled. The Roman altars and rites of worship much resembled the Greek.

ALTDORFER, ALBRECHT, painter and engraver, and one of the most celebrated of the old German masters, was born at Altdorf in Bavaria, in 1488.

Altdorfer did not paint much, but his pictures show a surprising patience and industry. There is in the Pinakothek at Munich a picture by him, representing Alexander's battle of Arbela, of which the labour is prodigious. There is perhaps not another picture in existence which contains so many figures; the design is however strictly

Gothic, and Altdorfer has wholly neglected the powerful aid of aërial perspective. This picture was formerly at Schleissheim, whence it was taken by the French to Paris, and Napoleon was so much delighted with it, that he ordered it to be hung up in his bath-room at St. Cloud, where it remained until 1815. Altdorfer's other pictures are in a similar style; he scarcely ever painted large figures.

As a wood-engraver Altdorfer is more generally known, and he is inferior to Albert Dürer alone, of the old German or little masters.

His metal plates are more numerous than his woodcuts, but they are inferior to his cuts. He lived chiefly at Regensburg [RATISBON], and died without issue, about 1538.

(Sandrart, *Teutsche Academie*, &c.; Heinecken, *Dictionnaire des Artistes*, &c.; Fiorillo, *Geschichte der Zeichnenden Künste*, &c.; Bartsch, *Peintre-Graveur*.)

ALTENBURG, the capital of the duchy of Saxe-Altenburg, is situated near the left bank of the Pleisse, in 50° 50′ N. lat., 12° 27′ E. *long*. The town stands on uneven ground, and consists of a main part and several *suburbs*: it is in parts well built. It contains a castle, eight churches, a gymnasium, a public library, an hospital, a theatre, &c. The chief branches of industry are manufactures of woollen cloth, ribands, gloves, porcelain, leather, carriages, brushes, &c. There is also a considerable trade in cattle and corn. The population is about 13,800.

ALTERATIVES, a word signifying 'things that produce a change.' Under this head are comprehended those medicines which do not produce any immediate or very perceptible effect, but which gradually bring the body from a diseased to a more healthy state. They are generally given in small and frequent doses, and, even when given in large doses, they are often repeated. The former mode of administering them is employed when they are powerful medicines, the latter when less active. Out of almost every class of medicines some one may be used as an alterative—its claim to be so regarded depending less upon its natural powers, than upon the manner in which these are modified, so as to effect a particular purpose. Thus by diminishing the dose, or combining them with other medicines, some of the most powerful drugs we possess are capable of being employed as alteratives, and made to produce effects exactly opposite to what they do when given alone or in large doses. Ten grains of ipecacuanha, for example, taken with some fluid into the stomach, will speedily cause a feeling of sickness, followed by vomiting—three or four grains will cause a feeling of sickness and loss of appetite, though not actual vomiting—while one-quarter or one-half a grain taken about an hour before each meal for several days in succession, will be found greatly to increase the appetite and improve the digestion. Yet even ten grains of ipecacuanha, if taken along with two of opium, will not produce any obvious effect on the stomach, but, if the patient be kept warm in bed, will cause a profuse flow of perspiration.

Many of the forms or preparations of mercury, even the most active and poisonous, when given in very small doses, neither prove purgative nor destructive to life, but, on the contrary, often produce signal benefit, relieving the patient from many complaints which rendered his days miserable, or even threatened to shorten them. Nor is the most dreaded of the mineral poisons—arsenic itself—incapable of contributing to the restoration of health, since we see it now make the shivering ague cease, and at another time cause the agonizing headache to depart. The medicines which are called alteratives act principally through the medium of the secretions and excretions. They are useful in cases of long-standing disease dependent on the imperfect performance of these functions. Their effects should, however, be watched, as by long-continued use they may exert an unexpectedly injurious effect upon the system.

ALTERED STRATA. In addition to the consolidation and division by cracks, joints, and fissures, to which all rocks have been subjected in unequal degrees, there are special cases of uncommon induration, internal re-arrangement of particles, and even the production of new mineral ingredients, which happen in the strata near to rocks of igneous origin, and along certain great fractures and flexures. Heat is usually appealed to for these effects, and justly; but in addition to mere pervading warmth, Von Buch supposes vaporization of some ingredients (as magnesia, which converts limestone to dolomite), and the solution of others in hot water, to be necessary to explain the various contents of mineral veins.

ALTE'RNATE. In geometry, angles are said to be alternate which are made by two lines with a third, on opposite sides of it.

In algebra, those terms of a proportion are said to be alternate which are separated from one another by another term; thus, in the proportion

2 is to 4 as 8 is to 16,

2 and 8 are alternate terms, as also 4 and 16.

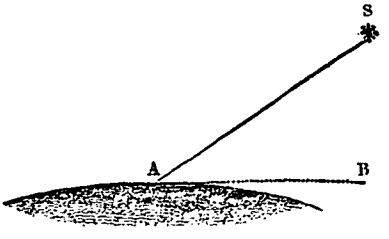
ALTHÆA OFFICINA'LIS, or MARSH-MALLOW, is a plant the use of whose mucilagi-

Marsh-Mallow.

nous roots and leaves in all cases in which emollient or demulcent substances are required, is of great antiquity. It is a common European plant, belonging to the natural order *Malvaceæ*, and is often found in marshes, especially near the sea, in great abundance.

Althæa Rosea, the *Hollyhock*, is another species, found wild in China, and now extremely common in our gardens.

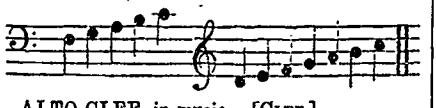
ALTITUDE, from the Latin *altus*, *high*, may be rendered by the English word *height*. This being the case, we should have referred it to the English word, if the term were not particularly reserved in astronomy to signify, not the *length*, but the *angle* of elevation. Thus, if A be the



position of a spectator on the earth, and A B the line on the horizon, which is drawn towards the point directly under the star S, the angle B A S is the altitude of the star. For other less common applications of the term, see HEIGHTS, MEASUREMENT OF.

The altitude of the pole is the geographical latitude of the place of observation, and remains the same throughout the twenty-four hours: the altitudes of the stars and sun change with the diurnal motion; being nothing when they rise and set, and greatest when they are on the meridian.

ALTO, in music, the highest natural adult male voice, or countertenor, the usual compass of which is



ALTO CLEF, in music. [CLEF.]

ALTO-RILIE'VO (high relief), a term which designates that kind of sculpture which is executed on a flat surface, but projects considerably above the ground or plane. The most legitimate use of alto-rilievo is where it is introduced in alternate or occasional compartments to give relief by the boldness of its projections to the uniformity of a large surface. Such are the Metopes among the Elgin Marbles, which, alternately with the triglyphs, ornamented the frieze of the entablature which surmounted the exterior colonnade of the Parthenon. Fifteen of these original Metopes, with one cast, are in the British Museum; they are of unequal execution, but several of them may be referred to as the finest examples extant of alto-rilievo.

ALTON. [HAMPSHIRE.]

A'LTONA, the largest and most populous town in the duchy of Holstein, which belongs to Denmark, stands on the north bank of the Elbe, in 53° 34′ N. lat., 9° 55′ E. long., and so near Hamburg, that the two cities are separated only by a field. The population is 30,000; of this number about 3000 are Jews, whose chief rabbi resides in Altona; the remainder are principally Lutherans, with some Calvinists and Catholics. The town contains six churches, a gymnasium or high school, an observatory, banks of savings and of exchange, several charitable institutions, and a royal mint, in which considerable sums are coined for the neighbouring states. The town lies higher than Hamburg, and is therefore healthier, and many of the Hamburg merchants have houses in it. In a commercial point of view, Altona and Hamburg form but one town. The chief trade is with France, England, the Mediterranean, and the West Indies. Ship-building is carried on to a considerable extent, and several vessels belonging to Altona are annually employed in the herring and whale fisheries. It enjoys in respect of trade several privileges, which constitute it a free port, and all sects, Jews included, have civil and religious liberty. A railroad connects the town with Kiel, a port on the Baltic. The principal manufactures consist of silk, woollen and cotton goods, tobacco, soap, and vinegar; there are also glass-houses, distilleries, breweries, and sugar-refineries in the town. Altona, which in the early part of the sixteenth century had been a mere village, was raised to the rank of a city in 1664: it was burned by the Swedes in 1713. (*Conversations-Lexicon*; Balbi; Stein, *Handbuch der Geographie*.)

ALTORF, the chief town of the canton of Uri, and the cradle of Swiss liberty, stands on the right bank of the Reuss, and near the entrance of that river into the Lake of Lucern, in 46° 52′ N. lat., and 8° 45′ E. long.: population 1700. The position of the town at the foot of a precipitous mountain, would be very insecure but for the pine forests on the slopes, which serve as ramparts against the falling rocks. The town was burnt in 1799, and has been since rebuilt. The town-house, parish church, and school-house, are the most remarkable public buildings. Altorf stands at the Swiss termination of the pass over Mount St. Gothard, and is an entrepôt for goods passing by that way into or out of Italy. The town is the scene of many of the exploits of William Tell, and abounds with grateful reminiscences of that hero. Among these last may be mentioned two fountains, 100 paces apart, which are said to mark the respective positions of Tell and his son during the well-known trial of the father's skill as a bowman. [TELL.]

ALTRINGHAM. [CHESHIRE.]

ALUM, an earthy salt, which occurs in a native state only in small quantities; but it has been long artificially made and extensively employed in various chemical manufactures. Its basis is sulphate of alumina, combined usually with sulphate of potash, but sometimes with sulphate of soda or sulphate of ammonia: when the first alkaline salt enters into its composition, the product is *common* or *potash alum*, the second

forms *soda alum*, and the third *ammonia alum*.

At La Tolfa, in Italy, alum is prepared from an alum-stone, which contains all the ingredients mixed with silica. At the alum-works near Whitby, in Yorkshire, alum is produced from alum-slate, the stratum of which is nearly thirty miles in length. The method of manufacturing, is to mix the broken alum-slate with fuel, and burn them together; when the combustion is over, the residual matter, consisting of earth, oxide of iron, and sulphate of alumina, is lixiviated with water; a solution of the earthy salt being obtained, potash salts are added to it, and crystals of alum are formed. It requires about 130 tons of calcined alum-slate to produce one ton of alum. Near Glasgow alum is manufactured from *clay slate;* which is obtained from coal mines, and contains a double sulphate of iron and alumina. When the slate containing this double salt is put into water, it is dissolved; by partial evaporation, crystals of sulphate of iron are obtained, and to the concentrated solution which remains, and which is principally sulphate of alumina, potash salts are added, and crystals of alum are formed; these are purified by re-dissolving them in water, and by crystallization. Alum is also produced in chemical works, by the direct union of the component ingredients. Alum is colourless, inodorous, has an astringent taste, and crystallizes generally in regular octahedrons; but by the addition of alumina, and particular management, it may be made to crystallize in cubes. It is brittle, and easily reduced to powder; its specific gravity is about 1.731; water, at 60° Fahrenheit, dissolves about one-eighteenth of its weight of alum, and boiling water about three-fourths of its weight. The solution reddens vegetable blue colours strongly; when exposed to dry air, alum effloresces slightly on the surface, but it remains long without undergoing any change internally. When moderately heated, alum dissolves in its water of crystallization; if more strongly heated, the water is evaporated, and when exposed to a very high temperature, sulphuric acid is expelled, and there remains a mixture of alumina and sulphate of potash.

The above-named properties relate to *common* or *potash alum*. *Soda alum* is produced by the action of sulphate of soda on sulphate of alumina; and *ammonia alum* by the action of sulphate of ammonia on sulphate of alumina. Their properties are very closely allied to those of potash alum.

Alum is decomposed, not only by heat, but by many of the acids, alkalies, and earths. It is employed for a vast number of purposes. It is used in lake colours, dyeing, calico printing, leather dressing; and by candle-makers to harden the tallow and render it white. It is an ingredient in making pyrophorus; and in medicine it is employed as an astringent.

By analysis, the three kinds are found to consist (in 100 parts) of

Potash alum.	Sulphate of alumina	35.73
	Sulphate of potash	18.07
	Water	46.20
Soda Alum.	Sulphate of alumina	36.94
	Sulphate of soda	15.28
	Water	47.78
Ammonia Alum.	Sulphate of alumina	38.15
	Sulphate of ammonia	12.50
	Water	49.35

ALUM-SLATE, a rock from which, as its name implies, alum is prepared. It is found in Germany, Sweden, Great Britain, and other countries. The colour of this slate is bluish-grey: its hardness varies; at the top part of the stratum it may be crumbled between the fingers; whereas at a considerable depth it is as hard as roofing slate. The specific gravity is about 2.48. By exposure to the air it effloresces, and acquires the taste of alum. Alum slate contains silica, alumina, and, before efflorescence, probably pyrites or bisulphuret of iron.

At Hurlett near Paisley, and Campsie near Glasgow, the double sulphate of iron and alumina, contained in the *clay slate* [ALUM] consist of soft delicate fibres, easily separable from each other; it is nearly colourless, of a silky lustre, and resembles asbestos in appearance.

ALUM STONE, as found at La Tolfa, in Italy, is usually a greyish-white mineral, translucent and frangible, occurring in small masses and veins in a secondary rock. Some specimens are crystallized in the obtuse rhomboid form.

ALU'MINA, the earthy oxide of aluminum, sometimes called argil, or argillaceous earth, constitutes the larger portion of all clays, and their plastic property is owing to it. In a pure state it is procured from alum, from which it derives its name. Alumina is widely diffused throughout the earth; the adamantine spar or corundum, the ruby, and sapphire, are alumina nearly pure and crystallized; these substances have not, however, any of the more obvious properties of common clay, for instead of being amorphous, soft, and diffusible through water, they are crystallized, are among the hardest substances in nature, and will not mix with water. The diaspore is a crystallized mineral, which consists almost entirely of alumina and water; and in North America another hydrate of alumina has been found, and called gibbsite.

Alumina is white, powdery, and light; it has neither taste nor smell, and it adheres to the tongue. Dr. Thompson states its constitution to be 1 atom of aluminum = 10, with 1 atom of oxygen = 8, giving 18 as its atomic weight. It is insoluble in water, but considerable affinity exists between them, as is shown by the high temperature required to decompose the hydrate. It shrinks considerably by heat, and may be fused at a high temperature. Alumina is not in itself either acid or alkaline; but it combines with numerous acids to form salts, among which the *acetate of alumina* is much employed in calico printing. It also combines with potash, soda, lime, and magnesia, so as to form salts called *aluminates*.

ALUMINA, SULPHATE OF. [ALUMINA.]

ALUMINATES. [ALUMINA.]

ALU'MINUM, the base of alumina, is generally regarded as a metal. Davy reduced alumina by voltaic electricity, and by the action of

potassium in vapour upon alumina heated to redness; but it was not reduced to a perfectly separate state till 1827, when Wöhler obtained aluminum in the form of a grey powder, which when burnished has the lustre of tin; it does not fuse at the temperature of melting cast-iron, and is a non-conductor of electricity. When heated to redness in the air, it burns with great vividness, and in pure oxygen it burns with so great splendour that the eye can scarcely support it. When heated to redness the heat evolved is sufficiently great to fuse the alumina partially, and it is then as hard as corundum. It enters into combination with most of the principal acids and alkalies. With oxygen it forms alumina.

ALU'NNO, NICCOLO', one of the old Umbrian painters of the fifteenth century. There are very few of his works extant. There is still at Foligno, over a side altar of the church of San Niceolò, a picture of that saint and the infant Christ, which was painted by Alunno in 1492. Alunno excelled in expression; he was in the habit, in his large pictures, of painting the heads from the life, which gave them a truth and reality not found in the works of many of his contemporaries. The time of his death is not known, but he painted after 1500; he painted in the old manner in water colours, or à tempera. (Vasari, *Vite de' Pittori*, &c.; Lanzi, *Storia Pittorica*, &c.)

ALURED, ALRED, or ALFRED, of Beverley, an English historian, who lived in the twelfth century. He is the author of an 'Epitome of British History,' to the twenty-ninth year of Henry I. It is written in a Latin style remarkable for its correctness, considering the age in which the author lived; and more attention appears to be paid in it to the dates of the events recorded than in most of our ancient chronicles. It exhibits, however, in many places, a strong resemblance to the similar work which bears the name of Geoffrey of Monmouth. Geoffrey's work has always been regarded as principally a translation from a British or Armoric original; and he and Alured may have drawn their information, to a considerable extent, from the same sources. Little can be depended upon for the personal history of Alured. His death is conjectured to have taken place in 1129, the year in which his annals terminate.

ALUTA, or ALT, a tributary of the Danube, which rises in Transylvania, in the eastern Carpathian Mountains. Its course is at first due south; it then makes a turn and runs nearly due north. Its general course is afterwards S.W., S.S.W., and S., till it reaches the Carpathian Mountains, through which it makes its way about 18 miles S.S.E. of Hermanstadt. From the mountains the Alt takes a general south course through Wallachia, and joins the Danube nearly opposite the town of Nikopolis. The whole length of its course is not less than 250 miles.

ALVA, DUKE OF. [ALBA.]

ALVAREZ, FRANCISCO, a Portuguese traveller, was born in the latter part of the fifteenth century, in the town of Coimbra. King Emanuel, of Portugal, in consequence of overtures from David, emperor of Abyssinia, in 1515, sent Edward Galvaõ on an extraordinary embassy to David, and Alvarez was appointed his secretary. Galvaõ died; but a new ambassador being appointed, the expedition landed at Arkeeko on the Abyssinian coast, on the 7th of April, 1520; and they arrived at the emperor's residence in Amhara, after passing through the countries of Tigré and Angot. After some years' residence in that city and country, Alvarez returned to Lisbon on 24th July, 1527. The king rewarded him with a handsome benefice, and ordered him to publish an account of his travels. Alvarez published his work at Lisbon, in one volume folio, a copy of which is in the British Museum. In his relation, the traveller speaks more of the country than of himself. The simplicity and frankness with which it is written are admirable. It bears the stamp of truth in every page. It is unfortunate that the writer gives no exact notions of the relative position of places, or of distances, particularly as he traversed and visited the then almost unknown countries of Angot, Amhara, and Efat. Alvarez died in 1540. (Mariana, book xxx. ch. 23—25.)

ALVAREZ, DON JOSE', a Spanish sculptor of the nineteenth century, was born at Priego, in the province of Cordova, in 1768. His father was a stonemason, and Alvarez's youth was spent as a labourer in that business. He however evinced an ability for sculpture at an early period, and employed what time he could spare from his daily labour with a view to educate himself as a sculptor. In his twentieth year he made such progress as to obtain admission into the Academy of Granada, in which he soon distinguished himself for his ability in modelling. He became a member of the Academy of Cordova, and subsequently a student of the Academy of San Fernando at Madrid.

In 1799 he was granted a pension of 12,000 reals by Charles IV. to enable him to prosecute his studies in Paris and in Rome. He gained there academical honours, and obtained the second great prize in sculpture awarded by the Institute. His statue of Ganymede obtained him the reputation of the first of modern sculptors.

In 1804, Napoleon, then emperor, paid two visits to the studio of Alvarez, and presented him with a gold medal. Notwithstanding this personal honour, Napoleon's after-conduct regarding Spain excited in Alvarez an invincible aversion to him: he would never model his bust, and when Joseph Bonaparte was proclaimed King of Spain, Alvarez, then at Rome, was imprisoned in the Castle of St. Angelo for refusing, as a pensioner of the Spanish government, to take the oath of allegiance to the new king; he was however released shortly afterwards. Henceforward he chiefly resided at Rome.

In 1825 he was appointed principal sculptor to the King of Spain, and was decorated with the cross of Civil Merit. In 1826 he visited Madrid for the purpose of selecting the best statues and other sculptures in the king's palaces to be placed together in the museum of the Prado; but he died within twelve months of his arrival, in the sixtieth year of his age.

It is generally admitted that Alvarez excelled

in many qualities of a high order, in invention, in expression, and in design; and he is by his admirers compared with Canova.

There was another distinguished Spanish sculptor of this name, Don Manuel Alvarez, who was born at Salamanca in 1727.

(*Archive für Geschichte*, &c., 1829, No. 15; *Seminario Pintoresco Español*, No. 52; Cean Bermudez, *Diccionario Historico de los mas Ilustres Profesores de las Bellas Artes en España.*)

ALVEOLI'TES (Lamarck), a genus of fossil Polypiaria, from the cretaceous and tertiary strata.

ALVERSTOKE. [Gosport.]

ALWAR, a town in Hindustan, the capital of the territory of the Raja of Machery, is situated at the base of a high hill, in 27° 33′ N. lat., 76° 45′ E. long. On the summit of the hill is the strong fortress of Rajeghur: Alwar is about 22 miles N. by W. from Machery, and 85 S.S.W. from Delhi.

ALYATTES, a king of Lydia, the father of Crœsus; he died about B.C. 562, after a reign of fifty-seven years. Near the Lake Gygæa, which is a few miles north of Sardis (now Sart), in Asia Minor, there is an immense mound of earth which was raised to his memory. Herodotus, who gives the first account of it (i. 93) says, that the circuit round the base was 3800 Greek feet, and the width (of the base?) 2600 feet. The height is not given. The mound still retains its general form. It stands among many smaller tumuli on a low ridge of limestone hills. The dimensions are much greater than those of any similar monuments in Great Britain. The circuit of Silbury Hill, which forms so striking an object on the Bath road, is inconsiderable when compared with the mound of Alyattes. (Chandler's *Travels in Asia Minor;* Hamilton, *Researches in Asia Minor.*)

In the reign of Alyattes a great eclipse took place while the Lydian and Median armies were fighting (Herod. i. 74); the place where the eclipse was seen is not mentioned by Herodotus; but we may conjecture that it was in the upper latitudes of Asia Minor, and between the Halys and the higher parts of the Euphrates. This eclipse was predicted by Thales of Milétus, but we cannot infer from the words of Herodotus that he predicted the day; all that the words of the historian can be made to signify is, that he predicted the year. Scaliger says this eclipse took place October 1, 583 B.C.; Volney, February 3, 626; Mayer, May, 603. Baily (*Phil. Transac.* 1811) has examined this subject.

ALYTH, a village in Perthshire, pleasantly situated near the Isla, a tributary of the Tay, and at the foot of a hill 12 miles W. by S. from Forfar; population in 1841, 1846. It has some manufactures of linen and yarn. The ancient gothic church, which had been for a long time out of repair, has been demolished, and a handsome new church was erected in 1839. Alyth was constituted a royal burgh in the fifteenth century, but never sent members to parliament.

A'MADEUS I., was the son of Adelaide, Marchioness of Susa, and of Humbert I., Count of Maurienne, in Savoy, called the 'White-handed;' some say he was the son of Oddo, Humbert's son. After his father's death he governed conjointly with his mother the states of Susa and Maurienne. This made him master of the great pass over the Alps into Italy, by Mont Cenis, from which circumstance much of the subsequent importance of his family was derived. He married a daughter of Gerald, Count of Burgundy. Amadeus was mainly instrumental in reconciling the Emperor Henry IV. and Pope Gregory VII., and thus putting an end to the disastrous contest between the church and the empire. He died soon after, in 1078, and was buried in the cathedral of St. Jean de Maurienne.

AMADEUS II. succeeded his father, Humbert II., count of Maurienne, in 1103. He accompanied Henry V. to Rome, where the latter was crowned emperor. As a reward for his fidelity, Henry gave him the title of Count of Savoy, and vicar perpetual of the empire. Amadeus also took the title of Marquis of Turin; and married the daughter of the Count, or Dauphin, as he was called, of Vienne, on the Rhone. Amadeus accompanied Louis VII. of France to the Holy Land, distinguished himself at the siege of Damascus, and relieved Acre, which was besieged by the Turks. On his return from Syria, he landed in the Island of Cyprus, where he died at Nicosia, of a fever, in 1148.

AMADEUS III. succeeded, in 1233, his father Thomas, as Count of Savoy, and his brother inherited Piedmont. Amadeus obliged the Count of Genevois to acknowledge himself his vassal: he also conquered the Chablais and the Lower Valais; and sent troops over the Little St. Bernard into the valley of Aosta, and subjugated that country. Amadeus died in 1246.

AMADEUS IV., called 'the Great,' succeeded his uncle Philip in 1285. By his marriage with Sybilla, Countess of Bugey and Bresse, these districts of ancient Burgundy were united to his states, and he succeeded in otherwise extending his dominions. Amadeus afterwards embarked for the East, where he assisted in the defence of Rhodes against the Turks in 1315. He died in 1323 at Avignon, where he had gone for the purpose of urging Pope John XXII. to proclaim a new crusade.

AMADEUS V. succeeded his brother Edward in 1329, continued the war against the Dauphin of Vienne, and died in 1342.

AMADEUS VI., called 'the Green Count,' son and successor of the preceding. In 1349 Humbert, last Dauphin of Vienne, disgusted with the world in consequence of the death of an only son, gave up his title and principality to Charles, grandson of Philip of Valois, and retired into a Dominican convent. Amadeus VI. was not pleased at this cession, which gave him a much more formidable neighbour than he had before; and a war ensued, in which Amadeus defeated the French in 1354. A treaty was concluded at Paris the following year, by which the Count of Savoy gave up to France the districts he possessed in Dauphiny beyond the rivers Rhone and Guier; and he, on his part, was acknowledged undis-

puted sovereign of Faucigny and the country of Gex, as well as suzerain lord over the Counts of Genevois, all which titles had been till then subjects of contention between the Counts of Savoy and the Dauphins of Vienne. Amadeus also obliged the Marquis of Saluzzo to pay him homage, and thus extended his dominion on the Italian side of the Alps. Amadeus's alliance was courted by the principal sovereigns of his time. He next engaged alone in a crusade, restored, and then quarrelled with the Greek Emperor, John Palæologus. An interesting account of this expedition from the original MSS. has been published by Pietro Datta, of Turin. On his return to Italy, Amadeus found that his affairs had fallen into confusion, which, however, he soon restored, and was looked upon as the arbiter of Italy. The Venetians and the Genoese had long quarrelled about the possession of the Island of Tenedos, in the Ægean Sea; but at last agreed to give it in full possession to the Count of Savoy. Amadeus in his old age was still thinking of another expedition against the Turks, but the Pope Clement VII. persuaded him first to accompany Louis, duke of Anjou, in his expedition to Naples, to which kingdom he was called by the adoption of Queen Joanna I. Amadeus went in 1382 and shared in the first successes of Louis, who conquered the Abruzzi and Apulia. A contagious disease, however, spread through the army, and the Count of Savoy was one of its earliest victims. He died at Santo Stefano, in Apulia, in 1383. He was the founder of the Order of the Annonciade.

AMADEUS VII., called 'the Red Count,' succeeded his father, Amadeus VI. He made the important acquisition of the county of Nice, by the unanimous wish of the citizens, in 1338, and the act was solemnly registered as a public document. He was killed by a fall from his horse, in 1391.

AMADEUS VIII., son and successor of the preceding, was created first Duke of Savoy in 1416, by the Emperor Sigismund, who declared the court of the duchy to be independent of the imperial chamber. Amadeus waged war against Philip Maria Visconti, Duke of Milan, and took Verçelli, which he united to his dominions. He also annexed to them the county of Genevois, having purchased the rights of the various claimants after the extinction of the male line. Thus the whole of Savoy was finally united under one sovereign. He was also Prince of Piedmont, Baron of Vaud, Lord of Nizza, Mondovi, and Valenza, Duke of Aosta, &c. Amadeus gave his subjects a code of laws called 'Statuta Sabaudiæ.' Under him Savoy enjoyed profound peace, whilst the countries around were a prey to foreign and civil wars. After forty-three years' reign, and having lost his wife, Maria Beatrix, of Burgundy, he retired, in 1434, to the hermitage of Ripaille, a delightful spot on the Lake of Geneva, with six of his nobles, whom he created Knights of St. Maurice. He entrusted the administration of his states to his son, Louis. For five years he lived at Ripaille, and here he medinted the peace of Arras between France and England. The council assembled at Basle, having deposed Eugenius IV. in 1439, called Amadeus to the papal chair. Amadeus at first refused, but being persuaded by the Cardinal of Arles, he assumed the pontifical dignity with the name of Felix V. At the same time he definitively abdicated his temporal sovereignty to his son, Louis. In June, 1440, the new pope proceeded to Basle, where he was solemnly crowned. France, England, Spain, Germany, and Lombardy, acknowledged him as pope, whilst the rest of Italy and the Venetians supported Eugenius, who continued to reside at Rome. The schism lasted nine years, but Eugenius having died, the cardinals who were at Rome elected Nicholas V., when Felix himself proposed to renounce his rights to Nicholas, and thus terminate the scandal of the church. This arrangement was effected in 1449, and Felix having solemnly deposed the tiara, and having received the title of Cardinal Legate, retired again to his favourite Ripaille. He died in January, 1451, at Geneva.

AMADEUS IX., duke of Savoy, succeeded his father, Louis, in 1465. He was called 'the Pious,' from his goodness and charity to the poor. He married Yolande, of France, sister of Louis XI. He reigned only eight years, and died at Vercelli, in 1472. He was succeeded by his son Philibert. Louis, Amadeus' brother, was for a while King of Cyprus, but his title to that kingdom was disputed. As heirs of Louis, however, the kings of Sardinia still assume the title of kings of Cyprus.

AMADIS DE GAULA, the hero of an old romance of chivalry, written in Spanish prose by Vasco Lobeira, towards the end of the twelfth century. It was afterwards corrected and edited in more modern Spanish by Garcia Ordoñez, of Montalvo, about the beginning of the sixteenth century, and became a very popular book in Italy and France; it was translated into French by D'Herberay, and printed in 1555, with many additions, under the mis-translated title of 'Amadis des Gaules,' meaning France. In the original Spanish romance Gaula is Wales; and the subject, characters, and localities, are British. The 'Amadis' is considered as one of the most interesting works in the whole library of chivalry and romance. There are also several other Spanish romances concerning Amadis and his family, which are, however, deservedly forgotten. (Warton's *History of English Poetry.*)

AMADOU is a brown leathery substance prepared from the *Boletus igniarius*, a fungus which grows on the trunks of cherry, ash, and other trees. The fungus is perennial, and increases yearly in size. The soft spongy substance of the fungus, after removing the outer covering, is cut into thin slices, and beaten with a mallet to soften it. In this state it is used for stopping hæmorrhages, and for other surgical purposes; and by subsequent boiling in a strong solution of saltpetre it is prepared for use as tinder, constituting the *German tinder* of the tobacconists. To render it very inflammable it is sometimes imbued with gunpowder, which gives it a darker colour.

AMAGER, or AMAK, a small and fertile

island in the Baltic, close to Copenhagen, with which it is connected by two bridges. That part of Copenhagen called Christianshafen is on the island. It is about six miles long and three broad, quite level, and has neither wood nor good water. The island supplies Copenhagen with garden vegetables, milk, butter, and cheese. A Dutch colony was established here in 1516, by Christian II. The inhabitants, in summer, send their cattle to pasture on the adjacent island of Saltholm.

AMALARIC, the last Visigoth king of Spain, was the son of Alaric II. and grandson of Theodoric II. At the death of his father, A.D. 506, he was only five years of age; and his succession to the throne was disputed by his bastard brother Gensaleic, but was maintained by the power of his grandfather Theodoric, and when of age he was acknowledged King of the Goths both in Spain and in Gothic Gaul. He married Clotilda, daughter of Clovis, king of the Franks. But this marriage gave rise to violent religious disputes, and these disputes, Amalaric being a violent Arian and Clotilda a zealous Catholic, ultimately led to a war with the brother of Clotilda, Childebert, or Childibert, king of Paris, who mustered a large army and marched against his brother-in-law. The two armies met, according to some authors in Gothic Gaul, and according to others in Catalonia. The Spaniards were defeated, and Amalaric was killed, in the year 531.

Amalaric was the last of the Visigoth kings, and the first who established the court at Seville. On his death, Theudis, an Ostrogoth, or eastern Goth, was elected king.

(Mariana, book v. ch. 7; Procopius, *De Bello Gothorum*, lib. 1.)

AMALEKITES, a nation who dwelt south-west of Palestine, between Edom and Egypt. (Gen. xiv. 7; Exod. xvii. 8—16; 1 Sam. xv. 7.) According to Josephus, ('Antiquities,') iii. 2, those who dwelt in Gobolitis and Petra were called Amalekites, and were the most warlike among the surrounding nations. He calls their country *Amalekitis*, and describes it as a part of Idumæa ('Antiq.' ii. 1). Josephus also calls the country of Midian Amalekitis, and says, that it was situated between Pelusium, on the borders of Egypt, and the Red Sea. ('Antiq.' vi. 7; s. 3, and ch. 8.) It appears also that they occupied several places in Palestine among the Canaanites, and in the land of Ephraim we find a mountain of the Amalekites where Abdon, the son of Hillel, was buried in Pirathon.

The Amalekites were the first who opposed the Israelites on their march from Egypt. (Exod. xvii. 8—13; Jos. 'Antiq.' iii. 2.) They suffered great loss, but were afterwards assisted by the Canaanites, and obtained a great victory. (Num. xiv. 39—45.) During the time of the Judges, the Israelites were frequently oppressed by the Amalekites, Ammonites, and Midianites. (Judges iii. 13; vi. 3; Joseph. v. 7.) Saul fought with the Amalekites, and took their king Agag alive, who was cut to pieces by the prophet Samuel. (1 Sam. xv.; Jos. 'Antiq.' vi. 8.) David warred against them (1 Sam. xxvii. 8;) and therefore the Amalekites plundered the town of Ziklag and set it on fire, but David overtook them in the wilderness, and recovered all that they had carried away. (1 Sam. xxx. 18; 'Antiq.' vi. 15.) The Amalekites were finally extirpated by the Simeonites, who occupied their country during the reign of Hezekiah. (1 Chron. iv. 43.) Thus, according to the direction of Moses, the remembrance of Amalek was blotted out from under heaven, because they slew the hindmost of the Israelites who fainted in the wilderness. (Deut. xxv. 17, 19.)

AMALFI, a town in the province of Principato Citra, in the kingdom of Naples, stands on the declivity of a hill overlooking the Gulf of Salerno, in 40° 37′ N. lat., 14° 35′ E. long. In the early part of the middle ages Amalfi was a republic, with a scanty territory, but renowned for its trade with Egypt and the East. It took part in the crusades, and its citizens founded in Palestine the hospital of St. John of Jerusalem, from which the celebrated military order took its name. It is the seat of an archbishop, and has a population of 3500. The town is much fallen from its former prosperity: after its conquest by Robert Guiscard the Norman, at the end of the 11th century, it is described by William of Apulia as the great mart for eastern goods, frequented 'by Arabs, Indians, Africans, and Sicilians.' Amalfi was taken from the Normans in 1137 by the Pisan fleet for Innocent II. Flavio Gioia, a citizen of Amalfi, is said to have discovered the mariners' compass about the year 1302.

AMALGAM, a compound of two or more metals, of which one is always mercury; and this circumstance distinguishes an *amalgam* from a mere *alloy*. Nature presents us with only one amalgam, which is of silver, and is termed by mineralogists *native amalgam:* it is met with either semifluid, massive, or crystallized in rhombic dodecahedrons. Klaproth found it to consist of 64 parts of mercury and 36 of silver, out of 100 parts. Most metals may be amalgamated with mercury, and the combination appears to depend on chemical affinity. When the cohesion of a metal is slight, as in the cases of potassium and sodium, or when its affinity for mercury is considerable, as in the instances of gold and silver, amalgamation takes place readily by mere contact. When, on the other hand, the cohesion of a metal is strong, or its affinity for mercury is weak, heat or intermediate action, or both, are requisite to effect amalgamation. The density of an amalgam exceeds that of the mean of the metals; this and the tendency exhibited by one or both metals to oxidize, are indications of chemical combination. Antimony offers an example of metals which will not amalgamate without heat. In order to effect combination, it must be melted, and while liquid mixed with hot mercury. Mere heat causes scarcely any action between iron and mercury. It has been stated, that they may be amalgamated by mixing the filings of the metal with powdered alum, and rubbing them together in a mortar with a little water; after trituration the alum may be washed out. By the intervention of tin or zinc, iron

may be combined with mercury, and a double amalgam is formed. Platina also unites with mercury by the intervention of the amalgam of potassium, but not by direct action.

Amalgams are either liquid, soft, or hard; their form being dependent, in some cases, upon the quantity of mercury employed, and, in others, upon the nature of the metal amalgamated: thus, an amalgam consisting of eighty parts of mercury and one part of sodium, is solid, whilst a compound of fifteen parts of mercury and one part of tin is liquid. The liquid amalgams resemble mercury in appearance, except that the greater part of them flow less readily: solid amalgams are brittle. In general, amalgams are white; they are all crystallizable, and then form compounds of definite proportions. The amalgams of the more oxidable metals, as of potassium and sodium, are decomposed by exposure to the air and absorbing oxygen, and they decompose water with the evolution of hydrogen gas; the double amalgam of iron and zinc does not rapidly undergo any change, and is not attracted by the magnet. All amalgams are decomposed by a red heat, the mercury being volatilized, and the more fixed metals remaining. The process of amalgamation and decomposition is employed to separate gold and silver from their ores; the mercury obtained by decomposing the amalgams is distilled, and repeatedly used for the same purpose, with comparatively little loss. The amalgams of gold and silver are employed in the processes of gilding and plating. The amalgam of tin is largely used in what is termed silvering mirrors, and various amalgams of tin and zinc are employed for exciting electricity in the machine. Some curious effects result from the action of amalgams upon each other: if mercury be added to the liquid amalgam of potassium and sodium, an instant solidification ensues, and heat enough to inflame the latter metals is evolved. When, on the other hand, a solid amalgam of bismuth is put in contact with one of lead, they become fluid, and the thermometer sinks during their action. There is a curious compound called an amalgam of ammonia, the real nature of which has not been satisfactorily explained.

AMALIA, duchess of Weimar, has earned a place in history by her patronage of genius. Left at the head of the government of the duchy, at an early age, by the death of her husband, she made the city of Weimar the resort of the most distinguished literary men of Germany. Wieland, Herder, Schiller, and Goethe, formed a constellation of talent of which any city might be proud. The Duchess Amalia withdrew from public life in 1775, having given up the sovereign authority to her eldest son, then of age, but continued her encouragement of letters and the arts in private life. She died in 1807.

AMALTE'O, POMPO'NIO, a distinguished painter of the Venetian school, born at San Vito in the Friuli, in 1505; died, it is supposed, about 1588. He was the scholar of Pordenone, and painted much in the style of that master, though he was less bold in execution and inferior to him in invention. Vasari praises, in the Life of Pordenone, some frescoes by Amalteo in the Castle of San Vito. Amalteo was distinguished for good drawing, a quality rare among the Venetian painters.

Pomponio's brother and pupil, GIROLAMO, who died young, had also great ability for painting, but he generally painted small pictures highly finished.

AMAN, JOHANN, an architect who executed many important buildings in Germany, was born at St. Blasien in Baden, in 1765. In his early practice as an artist he was remarkable for his ability as a painter on glass. His practice as an architect commenced in 1791, and he was employed by various German princes, and by the Emperor of Austria, till his death in 1834.

AMAND LES EAUX, ST., a town in France in the department of Nord, on the river Scarpe, about seven miles N.W. of Valenciennes; population about 9000. The district in which St. Amand stands produces great quantities of excellent flax, in which there is a considerable trade. Porcelain, lace, and leather, are manufactured. There are mineral waters and baths near the town which are much frequented. The fountains of the town are supplied from artesian wells.

Another town, distinguished as ST. AMAND MONT ROND, in the department of Cher, stands at the junction of the Marmande and the Cher, twenty-five miles S.S.E. of Bourges. The population of the commune in 1841 was 6992. It is one of the most active towns in the department, and is the mart of the grain, chestnuts, wine, ship-timber, and fat cattle of the district. There are a college, an agricultural society, and a foundry for cannon in the town. There are several other small towns of the name of St. Amand in France. (*Géographie Universelle;* Balbi, *Géographie.*)

AMA'NUS. [TAURUS, MOUNT.]

A'MARA, or AMARASINHA, an ancient Hindu grammarian, and author of one of the oldest and best original vocabularies of Sanskrit nouns, called after his name 'Amara Kosha,' that is, the Thesaurus of Amara, but sometimes quoted under the title of 'Trikanda,' that is, the Tripartite. Numerous authorities assert that Amara was a contemporary of King Vikramaditya; and his name is included in a memorial verse among the Nine Gems, or nine distinguished poets and scholars who adorned the court of that prince. Mr. Colebrook ('Algebra from the Sanskrit,' Introd. pp. 45—51), from astronomical data in the work of Varahamihira (another of the Nine Gems), has assumed the close of the fifth century, or about the year 472, as the probable epoch when that astronomer wrote and this Vikramaditya (for several kings of that name occur in Indian history) and the Nine Gems lived. This opinion with regard to Amara is supported by the frequent reference made to his Dictionary as to an ancient and classical work by numerous writers, to many of whom an antiquity of several centuries at least can be confidently attributed.

Like other original Sanskrit vocabularies, that of Amara is in metre, to aid the memory. The whole is divided into three books. The Sanskrit Dictionaries or 'Koshas,' do not include the verbs of the language, the stems or roots being arranged and explained in separate lists. The 'Amara Kosha

contains only about 10,000 different words. In a language so copious as the Sanskrit this number appears small: but in consequence of the great regularity with which Sanskrit compound nouns and derivatives are formed, very few of these require to be inserted in a Dictionary. Real deficiencies in the list of Amara are supplied partly by commentaries on it, and partly by more recent Dictionaries, one of which, the 'Trikandasesha,' by Purushottamadeva, is, what its title implies, a supplement to the tripartite work of Amara.

An excellent edition of the 'Amara Kosha,' with marginal explanations and notes in English, and an alphabetic index, was published by Mr. H. T. Colebrooke at Serampore, 1808, 4to.; reprinted, 1829, 8vo. An edition of the mere Sanskrit text, and table of contents likewise in Sanskrit, appeared at Calcutta in 1813, in a volume with three other original Sanskrit vocabularies.

(*Asiat. Res.* vii. p. 214, seq.; Wilson's *Sanskrit Dictionary, Preface*, p. 5. seq. first edit.)

AMARANTA'CEÆ, a natural order of apetalous dicotyledonous plants.

The species are found chiefly in tropical countries, where they are often troublesome weeds. The cock's-comb, the globe-amaranth, the prince's-feather, the love-lies-bleeding of our gardens belong to the order; which does not contain a single species in which any deleterious property has been found.

AMARAPOURA, a city in the Birman empire, six miles east of Ava, in 22° N. lat., 96° 18′ E. long., was founded in 1783, by the monarch then on the Birmese throne, and was declared the capital of the empire. The seat of government has since been removed, or rather has returned to Ava. Amarapoura stands near the east bank of the Irawaddy. The houses are mostly built of wood: many of the public buildings have a very striking appearance, owing to the splendour of the gilding with which their roofs are covered, both within and on the outside. In March, 1810, nearly the whole of the city, consisting of 20,000 to 25,000 houses, was burnt to the ground. The population at that time was estimated at more than 170,000; but owing partly to this calamity, and partly also to the removal of the seat of government in 1819, the present estimate of its population does not go beyond 30,000 persons. The fortifications of Amarapoura are equal in strength to most of the native fortresses in India. The fort is a square building with walls twenty feet high, which are faced with brick, and strongly built. The river Irawaddy offers the advantage of water-carriage to and from the city, which is situated near a fertile district, where abundance of wheat is raised of good quality. (Captain Cox's *Notes on the Birman Empire;* Berghaus, *Asia*, and *Atlas.*)

AMARYLLI'DEÆ, or the narcissus tribe of plants, is a group of monocotyledonous genera. Their bulbs are dangerous poisons; the juice of that of *hæmanthus toxicarius* is inspissated by the Hottentots, who smear their arrow-heads with it; other kinds are not less fatal, and even the common daffodil contains within its bulbs an acrid irritating principle which renders it a powerful emetic. Like many other poisonous families, this occasionally secretes a kind of fæcula, or flour, which, when separated from the juice that is naturally mixed with it, becomes a wholesome article of food; the arrow-root of Chili is yielded by an *alstrœmeria*, which belongs to amaryllideæ.

The species, which are chiefly scattered over Brazil, Africa, and tropical Asia, are nearly all bulbous; a few only acquire a high degree of development and lose their bulbous character, as the doryanthes of New Holland. No tribe is more admired by cultivators, in consequence of the beauty of its flowers.

AMASI'YAH or AMASIA, a sanjak of Anatolia, and also the name of the principal town of the province, which is in 40° 38′ N. lat., 35° 59′ E. long. Amasiyah was the birthplace of the Greek geographer Strabo. Its ancient name of Amasia or Amaseia can scarcely be said to have undergone any change. 'My city,' says Strabo (Casaub., p. 561), 'stands in a deep and extensive gorge, through which the Iris (now the Tocat-su) flows. It is surprisingly favoured both by nature and art, being at once adapted to serve both as a town and a garrison: a rock, lofty and precipitous all round, descending with rapid slope to the river, has on the one part a wall close on the bank of the stream, where it joins on to the city; and on the other part the wall runs up on each side of the hill to the summits, of which there are two, naturally connected and exceedingly well fortified. Within the enclosure made by the wall are the palace and the tombs of the kings. The summits have a very narrow neck, the ascent to which is five or six stadia on each side from the bank of the river and from the suburbs; and from the neck to the summits is about another stadium of steep ascent, which is altogether impregnable. * * * On the tops also water is carried up under the rock; two galleries (*σύριγγες*) being cut, one to the river and the other to the neck. * * * There are two bridges on the river, one from the city to the suburbs and another from the suburbs to the country; at this latter bridge terminates the mountain which overhangs the rock.' The situation of the town corresponds to Strabo's description; the tombs of the kings, five in number, are excavated in the steep face of the rock on which the castle is built, and the old Greek wall extends along the face of the hill below the tombs, which are consequently within the enclosure, as Strabo says.

Hamilton observes ('Researches in Asia Minor,' vol. i., p. 363, &c.), that there are not two distinct points connected by a narrow intermediate ridge, but one only, from which two narrow ridges extend, one to the north and the other to the east, which last terminates abruptly close to the river. This part of Strabo's description is not clear, and the exact translation is somewhat doubtful. Hamilton explored a subterranean flight of stairs, one of the galleries (*σύριγγες*) of Strabo, to the depth of about 300 feet, where he found a small pool of cold clear water.

Amásiyah can only be approached by two narrow passes, one on the north and the other on the south. The river Tocat-su, on both sides of

which the town is built, runs in a deep, narrow channel, both above and below the town, and is not suitable for navigation. The houses are meanly built, and are about 4000 in number, of which about 350 are inhabited by Armenians. The chief produce of the place is silk.

The name Amasia is written Amasseia on the earlier coins, and Amasia on those struck under the early Roman emperors.

(Rasche, *Lexicon Rei Numariæ; London Geographical Journal*, vii. 50, x. 442.)

AMA'SIS, or AMO'SIS, the eighth king, according to Africanus, of the twenty-sixth dynasty of Egyptian kings, reigned from B.C. 569 to B.C. 525. Amasis being sent by Apries (the Pharaoh Hophra of Scripture, Jerem. xliv. 30) to stop a mutiny in the Egyptian army, was proclaimed king by the rebels, and returning at the head of this army, he defeated his master, who was supported by a force of 30,000 Carians and Ionian Greeks. Amasis thus became King of Egypt, and Apries was put to death.

Amasis married a Greek wife from Cyréne, and he allowed Greek merchants to settle at Naúcratis, and to build temples and bazaars. He decorated Sais, the chief city of the nomos or district in which he was born, with magnificent propylæa to the temple of Athenæa, enormous colossi, and large androsphinxes. But his great architectural achievement was a mónolith (one-stone) temple which he brought from the granite quarries of Syéne, down the Nile, a distance of about 600 miles. The exterior dimensions of this stone were 31½ Greek feet long, 21 broad, and 12 high: a chamber was cut out in the interior, the dimensions of which were 28¼ feet long, 18 broad, and 7½ high. ('Library of Entertaining Knowledge —Egyptian Antiquities.') Sais, the royal residence of Amasis, is now a mass of rubbish called Sa el Hajar, or Sa, 'the Rock.'

Amasis also made a colossus 75 Greek feet long, flanked by two smaller figures 30 feet high, which he placed in front of the great temple of Hephæstus (Phtha) at Memphis. He was succeeded by his son Psammenítus, who was conquered by Cambyses the Persian, B.C. 525.

(*Description de l'Egypte, Antiq.*, vol. v.; Herodotus, ii. 162—182.)

AMA'TI, HIERO'NYMUS, the name of a celebrated maker of violins, a native of Cremona in Italy, who lived about the year 1600. His son, Anthony, and his grandson, Nicholas (son of the latter), were also excellent makers.

AMA'TO, or AMATUS, JOANNES RODERICUS, often called Amatus Lusitanus, a very eminent physician of the sixteenth century. Amato was of a Jewish family, and was born at Castel-Branco, in the province of Beira, in Portugal, in 1511. Like many of his nation, concealing his religious faith, he was educated at Salamanca; after leaving which, he travelled in France, the Netherlands, Germany, and Italy. He remained for some time both at Venice and Ferrara, giving lectures on the medical art. Before 1549, Amato had removed to Ancona, where he resided and practised his profession till 1555. While here, he had the honour of being several times called to Rome to attend the Pope, Julius III. Dread of the Inquisition, however, whose notice had been attracted to him as a concealed Jew, induced him, in 1555, to withdraw to Pesaro. From Pesaro he some time after retired to Ragusa, and from thence, in 1559, to Thessalonica (Saloniki), where he made open profession of the religion of his forefathers. He is ascertained to have been alive in 1561, but no notice of him occurs after that date, and it is not known when he died. Amato is the author of two works, both of which were long ranked among the most esteemed medical treatises of modern times. The one is entitled, in the first edition, printed in 4to, at Antwerp, in 1536, 'Exegemata in Priores duos Dioscoridis de Materia Medica Libros;' and in subsequent editions, 'Enarrationes in Dioscoridem.' The other is his 'Curationum Medicinalium Centuriæ Septem.' In both these works, the author is said to show an intimate acquaintance with the writings of the Greek and Arabic physicians; and they are also stated to contain many curious notices both in medicine and in natural history. Some of his biographers mention a translation into Spanish by Amato of the 'Roman History' of Eutropius.

AMA'TO, GIOVANNI ANTONIO D', a distinguished painter of the early half of the sixteenth century, and one of the best of the Neapolitan painters, was born at Naples in 1475. His style is very similar to that of Perugino. He painted in oil and in fresco, but his frescoes have almost all disappeared. Amato was a man of general acquirements, and devoted much of his time to the cultivation of letters. He died at Naples in 1555.

AMAU'ROSIS (*ἀμαύρωσις*, 'a darkening, or making obscure'), dimness of sight, blindness. [GUTTA SERENA.]

AMAZI'AH, or AMAZIAHU, means literally 'one strengthened by Jehovah,' and is the name of the ninth King of Judah, who began to reign when he was twenty-five years old, about the year 838 B.C., after his father Joash had been murdered in the house of Millo by his own servants, Jozachar and Jehozabat. (2 Kings xiv.) Amaziah reigned twenty-nine years in Jerusalem; his mother's name was Jehoaddan of Jerusalem. He fought with the Edomites, of whom he slew 20,000, and took *Selah* and called it *Joktheel*. The name of Selah is translated *Petra*, 'rock,' by the Greeks. The remains at this place in Arabia Petræa, between the Dead Sea and the Elanitic Gulph, are described by Irby and Mangles ('Travels,' p. 336, &c.)

Amaziah next declared war against Jehoash, the King of Israel, but was defeated, and taken prisoner. Jerusalem was also taken, and plundered. Amaziah, however, recovered his liberty, and reigned fifteen years after the death of Jehoash, when a conspiracy having been formed against him, he fled to Lachish; but he was pursued and slain there, and buried in Jerusalem. He was succeeded by his son, *Azariah* ('Help of Jehovah'), or *Uzziah* ('Power of Jehovah'), who was 16 years old (2 Kings xiv.; 2 Chron. xxv.; Jos. 'Antiq.' ix. 9, 10).

A'MAZON, or MARAÑON, or ORELLA'NA, is the name given to a river which traverses the equatorial regions of South America nearly in its whole extent, running chiefly from west to east, and having its embouchure almost under the equator. It is the largest river on the globe, not only for the length of its course, but also for the extent of country which is watered by this noble stream, and its great tributaries.

Geographers are not agreed whether the true source of this river is the Tunguragua or the Ucayali. The *Tunguragua* or *Upper Marañon* rises in Lake Lauricocha, among the Andes, in 10° S. lat.; and after flowing 400 miles through a mountainous region, it descends to the plains by a series of rapids and cataracts of great impetuosity. After receiving many tributaries, it joins the Ucayali at St. Joaquin de Omaguas. This last-named river is supposed to have its origin near Lake Titicaca, but its course is not well known.

The *Amazon*, which is formed by the junction of the two rivers just described, flows nearly eastward through twenty-two degrees of longitude, in no place far removed from the equator. During this course it receives many rivers of great magnitude. Of those which enter it on the northern bank, one is the *Napo*, which rises in the Andes and flows about 700 or 800 miles. Another in the *Putumayo*, about as long as the Napo. A third, rising like the other two among the Andes, is the *Yapura*, whose length is 900 miles. But the longest of them is *Rio Negro*, which rises among the Andes near the equator, receives the *Guapes* (500 miles long) and the *Rio Branco*, (500 miles), and joins the Amazon about 60° W. long., after a course of 1400 miles. The rivers which enter the Amazon on the south are less known than those on the north. Among them are the *Yavari*, the *Yutai*, the *Yurua*, the *Tefe*, and the *Purus*. The *Madeira* is better known; this river is formed by the junction of the *Mamoré* and the *Guaporé*, and enters the Amazon (at about 59° W. long.) after a course of no less than 1800 miles. Two other large rivers enter the Amazon on the south: the *Topayós* (900 miles) and the *Xingu* (1000 miles).

Towards its embouchure the Amazon divides into two branches, of which the northern is by far the broadest, and retains its name. The width of the channel between the island and the continent is about 18 miles, but towards its mouth it widens to 30 miles. The width of the river generally is, of course, various. In the upper parts of its course it averages from one to two miles; but lower down it grows much wider, and after its junction with the Xingu it is hardly possible to discover its opposite banks. From the sea to the mouth of the Rio Negro the depth of the main channel is nowhere less than 30 fathoms; higher up it varies from 10 to 12; and up to the junction of the Tunguragua with the Ucayali there is depth of water for vessels of almost every description. Higher up, only vessels not drawing more than five or six feet water can proceed with safety. The shoals of the river are very numerous; and the navigable channels in many places narrow, winding, and subject to continual changes. The banks of the river being low are subject to be under water during the freshets and great swellings in the rainy season: when they happen, the country is inundated for many miles on each side of the river, the whole of the numerous islands are covered with water, and often either change their situation, or new ones are formed.

The islands formed by this river are almost innumerable, and of all sizes; many are 12 or 15 miles in circumference; some 30 or 36; and one near the mouth is much more. In the rainy season the rapidity of the stream is about four miles an hour. The tide flows up to a distance of 400 miles from the mouth. When the stream, aided by the ebb of the tide, reaches the ocean, a great perturbation arises from the meeting of the river and an ocean current, which crosses it at right angles; and the river stream is perceptible in the ocean at 500 miles from its mouth. The entire length of the Amazon is estimated at 3300 or 3700 English miles, according to which of the two sources is adopted. The Amazon is connected with the Orinoco by a cross or diagonal river called the *Cassiquiari*.

The country on either bank of the river is but little known to Europeans. It produces cacao, sarsaparilla, copaiba, caoutchouc, fine forest trees, and many other plants; and the river itself yields abundance of fish; but the slow progress of European enterprize in that region has yet done little to develop its resources.

(*Travels*, by La Condamine, Humboldt and Bonpland; *History of Brazil*, by Southey; *Journ. of Lond. Geog. Soc.* vol. ii.; and *Narratives*, by Mawe, Pöppig, and Smyth.)

A'MAZONS, a fabulous nation of female warriors. Two Scythian princes, according to Justin, wandering from their own country, reached the river Thermódon in Cappadocia with their followers, and settled there. The new comers in time provoked the anger of their neighbours, and, in a war which ensued, their male population was almost exterminated. The women then took up arms, and with so much better success, that in future they resolved to live without men, and put the remaining males to death. They elected two queens, who in turn commanded their armies in the field, and kept order at home. Their chief seat was Themiscyra, on the river Thermodon, near the southern coast of the Euxine Sea. The Amazons invaded Attica in the time of Theseus, under the command of Hippólyta; and the battle between the Amazons and Athenians was painted at Athens in the portico called Poécile. (Pausanias, i. 15.) Though the Amazons rejected the fellowship of men, they did not neglect the care of continuing their race; but they only brought up female children, whom they educated in the arts of war, searing the right breast, that it might not interfere with the free use of the arm. They are usually figured, in medallic and other representations, with a short mantle, reaching to the knee, and the left breast bare. Their weapons were a crescent-shaped shield, bows and arrows, and the double-edged battle-axe. Diodórus and Q. Cur-

tius state, that Thalestris, queen of the Amazons, paid a visit to Alexander in Hyrcania; and Plutarch says, that certain Amazons fought with the Albanians against Pompeius. The story of some Amazons being presented to Alexander is discussed by Arrian (vii. 13), and rejected; but Arrian believes that there was once a race of Amazons. The etymology of the word is uncertain. It was doubtless a foreign name which the Greeks received, and to which they gave a Greek form.

Alvarez, who visited Abyssinia in 1520, speaks of a race of Amazons south of Damot, who fought with bows and arrows, mounted on bullocks. They destroy the left breast when young. They live with their husbands, but are governed only by a queen: the men have nothing to do with war. Pierre Petit has written a long book ('Traité Historique sur les Amazons') to prove that there were Amazons, in which most that is reported about them is collected. (Herodotus iv. 110-116; Strabo; Diodorus.) The figure of an Amazon is a common type on ancient coins. (Rasche, 'Lexic. Rei Num.')

AMBASSADOR, may be defined to be a person sent by one sovereign power to another to treat upon affairs of state.

Among the ordinary functions of an ambassador, the following are the most important:—1st, to conduct negotiations on behalf of his country. The extent of his authority in this respect is marked and limited by the power which he has received from home; he has, however, according to modern usage, no authority to conclude any engagement definitely, the treaty which he has negotiated having no binding power till it has been formally ratified by his government. 2ndly, to watch over the accomplishment of all existing engagements. 3rdly, to take care generally that nothing is done within the territories of the state, nor any treaty entered into with other powers, by which the honour or interests of his country can be affected, without informing his government of such measures.

An ambassador has also certain duties to perform towards private individuals of his own nation: such as to provide them with passports, where they are required; to present them at court, if they produce the requisite testimonials; to protect them from violence and injustice; and if any manifest wrong has been done, or if justice has been refused them, to exert himself to obtain redress, and to secure for them the full benefit of the laws; and, lastly, to assist them in maintaining their rights in courts of justice, as well by certifying what is the law of his country upon the point in dispute, as by the authentication of private documents, which is usually confined in practice to such as have been previously authenticated at the foreign office of his own government, and thence transmitted to him.

It is now the established usage of European countries and of those parts of North America which were colonized by Europeans and have become independent states, to send ambassadors to one another. The sending of an ambassador by any state implies that such state is also willing to receive an ambassador. A refusal to receive an ambassador properly accredited, if made without sufficient cause, is considered a gross insult to the power that he represents.

It is the duty of a state, with respect to ambassadors sent to it, to protect them from everything which may in any degree interfere with the due performance of their functions. The first privilege of an ambassador in the country to which he is sent, is perfect security. The second important privilege of an ambassador is, that no legal process can affect him, in his person or his property. Ambassadors are, therefore, deemed not to be amenable for their conduct before any criminal tribunal of the country they reside in. The same principle also extends to civil suits, and no claim can be enforced against an ambassador by any compulsory process. These privileges are not confined to the ambassador alone, but are extended to all his suite. The law of nations in this respect is fully recognised by the law of England. By the statute of 7 Anne, c. 12, all legal process against the person or goods of an ambassador, or any of his domestic servants, is declared to be void. The third important privilege of an ambassador is, that his residence enjoys a security similar to that of his person and property: it is not only protected from open outrage, but it is likewise exempted from being searched or visited, whether by the police, by revenue officers, or under colour of legal process of any description whatever.

The great powers at the Congress of Vienna, in 1815, divided diplomatic agents into—1, Ambassadors, legates, or nuncios; 2, Envoys, ministers, and other agents accredited to sovereigns; 3, Chargés d'Affaires, accredited to the department of foreign affairs.

Consuls are not in general reckoned among diplomatic ministers; in some particular cases, however, where they have diplomatic duties to perform, they are accredited and treated as ministers.

To the courts of Paris, Vienna, St. Petersburg, and the Porte, the British government sends an 'ambassador;' to the courts of Prussia, Spain, the Two Sicilies, Holland, Belgium, Portugal, Sweden, Hanover, Brazil, and to the United States, it sends an 'Envoy Extraordinary and Minister Plenipotentiary;' to Sardinia, Denmark, Bavaria, Würtemberg, and Frankfort, an 'Envoy Extraordinary;' to Saxony, Tuscany, the Swiss Cantons, Greece, Mexico, and Buenos Ayres, a 'Minister Plenipotentiary;' to the states of New Granada, Venezuela, Peru, Chili, and Texas, a 'Chargé d'Affaires.' The principal secretary of an ambassador is termed 'Secretary of Embassy,' and of envoys and ministers, 'Secretary of Legation.' The salaries and pensions for diplomatic services are paid out of the consolidated fund, and are regulated by 2 & 3 Wm. IV. c. 116.

For further information on the subject of ambassadors, the reader may consult Wicquefort, 'De l'Ambassadeur;' 'Les Causes Célèbres du Droit des Gens,' by C. De Martens; and the writers on the law of nations, particularly Vattel and G. F. Martens; and likewise the 'Cours de Droit Public,' par Pinheiro-Ferreira.

The functions of permanent ambassadors appear to have originated in modern times. The

ambassadors (πρέσβεις) sent by the Greek states, and those sent by the Romans (legáti) or received by them, were limited to extraordinary occasions. Among the Romans, ambassadors were often sent by foreign nations to them, and sent by the Romans to foreign states, and the law with respect to them ('Jus Legationis;' *Livy*, vi. 17) became in course of time well settled. Ambassadors to Rome were under the protection of the state, whether they came from a hostile or a friendly nation. They were received by the Roman senate and transacted their business with that body. The senate appointed the ambassadors who were sent from Rome to foreign states. The expenses of such ambassadors were paid by the Roman state, but the ambassadors were also entitled to make certain demands from the provincials in their progress through a Roman province.

The word 'legatus' is a participle from the verb 'lego,' and signifies a person who is commissioned or empowered to do certain things.

AMBEER (or UMEER, according to Bishop Heber), a ruined town in the principality of Jyepoor, in Hindustan, in 26° 57′ N. lat., 75° 40′ E. long., about five miles north from the city of Jyepoor, was formerly the capital of the principality. When the Raja Jye Sing built Jyepoor, and made it his capital, Ambeer fell into decay. The ruins of the town, overgrown with trees and underwood, and intermingled with towers and temples, are situated in a valley, on the margin of a small lake. The town is overlooked by an old fortified palace, which is connected by a long line of embattled wall with a very large castle on the top of the hill. The palace, which is still in a good state of repair, though uninhabited, is approached by a broad and long flight of steps, and the entrance is through a richly ornamented gateway. Bishop Heber says, that the interior courts of the palace contain one very noble hall of audience, a pretty little garden with fountains, and a long succession of passages, cloisters, alcoves, and small and intricate apartments, many of them extremely beautiful, and affording from their windows, balconies, and terraces, one of the most striking prospects which can be conceived. The carving in stone and marble, and the inlaid flowers and ornaments of the apartments, are equal to those at Delhi and Agra, and only surpassed by the beauties of the Taje Mahal [AGRA]. There is a large quantity of stained glass in the windows, in a good state of preservation. This palace, as well as that at Jyepoor, was the work of Jye Sing. The castle on the top of the hill is very strong, with high towers and machicolated battlements, and was said, when Bishop Heber was there, to contain many state prisoners. He was not permitted to see the interior. (Heber's *Journey through the Upper Provinces of India.*)

AMBER, a carbonaceous mineral which occurs in beds of lignite, in Greenland, Prussia, France, Switzerland, and some other countries. The greater portion of it comes from the southern coasts of the Baltic Sea, where it is thrown up between Königsberg and Memel. It is also obtained by mining at a distance of 200 feet from the sea, and at a depth of about 100 feet, and is found in small cavities. It is occasionally met with in the gravel beds near London, in which case it is merely an alluvial product. Amber occurs generally in small pieces, which are sometimes colourless, frequently light-yellow, or deep-brown, and very commonly translucent; two large masses have, however, been found, one of them weighing upwards of thirteen pounds, and the other more than eighteen.

Amber is rather harder than common resins, which it resembles in several properties: it is susceptible of a good polish, and when rubbed becomes electrical; indeed the word *electricity* is derived from ἤλεκτρον, the Greek name for amber. Its density varies from 1.065 to 1.070: when bruised it exhales a slight aromatic odour; and when heated to 448° of Fahrenheit it melts, then inflames and burns with a bright flame, and emits a smell which is not disagreeable.

The subject of the origin of amber is one which has been much discussed. According to Berzelius it was originally a resin dissolved in a volatile oil or natural balsam; the proofs of this opinion are, he conceives, numerous; it has often the impression of the branches and bark upon which it has flowed and solidified; it often contains insects, some of which are so delicately formed, that they could not have occurred except in a very fluid mass. Sir David Brewster concludes, from an examination of the optical properties of amber, that it is an indurated vegetable juice. Amber consists of a mixture of several substances, which are, a volatile oil, two resins soluble in alcohol and in ether, succinic acid, and a bituminous body that resists the action of all solvents, and which is the principal part of amber. Water does not act upon this substance; it does not even dissolve any of the succinic acid. Alcohol takes up a soft, yellow, limpid resin. Sulphuric and nitric acid both dissolve it.

Amber is employed for ornamental purposes in the manufacture of necklaces, &c. It is used also for preparing amber varnish, for obtaining a peculiar oil used in medicine, and it yields succinic acid employed in chemical investigations.

AMBERG, a well-built town on the river Vils, in the circle of Regen in Bavaria, stands in 49° 27′ N. lat., 11° 48′ E. long., and is about 40 miles E. of Nürnberg; population 6000. Its public edifices consist of the church of St. Martin, which is adorned with several fine monuments, a college, an arsenal, guildhall, house of correction, lyceum, high school, library, and cabinet of natural history. It has an extensive manufactory of arms, besides manufactures of earthenware, woollen cloths, tobacco, &c., and is the seat of a royal mint. There are considerable iron mines in the neighbourhood.

AMBERGER, CHRISTOPH, a German painter, born at Nürnberg about 1490; died about 1568. His father was a stonemason, and his grandfather was a carver in wood at Amberg. Amberger painted in oil and also in *fresco*. His oil pictures are chiefly portraits, much in the style of Holbein, whose portraits he studied and copied, and some of his copies pass as the originals of Holbein. His historical pieces in oil are very

small, and executed in the hard manner and sharp gothic style of that period in Germany, without any feeling for aërial perspective, though the rules of linear perspective are well observed in his works: his colouring is rich. His best works are at his native place Amberg, in the church of St. Martin and in the Franciscan convent there.

AMBERGRIS, a substance of animal origin, found principally in warm climates, floating on the sea, or thrown on the coasts. The best comes from Madagascar, Surinam, and Java. It has been found in the intestinal canal of the *physeter macrocephalus*, mixed with the remains of several marine animals which have served it for food; on this account it has been supposed to be a morbid product, analogous to biliary calculi.

Ambergris of good quality is solid, opaque, of a bright grey colour, which is darkest externally, and intermixed with yellow or reddish striæ. When it is heated or rubbed it exhales an odour which is agreeable to most persons. It is sufficiently soft to be flattened between the fingers. Its specific gravity varies from 0.908 to 0.920. When ambergris is heated with boiling alcohol of specific gravity 0.833, until it is saturated, a peculiar substance, called *ambrein*, is obtained as the solution cools, grouped in mammillated, small, colourless crystals. Ambrein, thus obtained, is brilliant, white, and insipid; it has an agreeable odour. When heated upon platina foil it fuses, smokes, and is volatilized, leaving scarcely any residue; by dry distillation it becomes brown. It is very soluble in strong alcohol, either hot or cold, in ether, and in oils both fixed and volatile. Nitric acid converts it into a peculiar acid, called *ambreic acid*. By another analysis, ambergris appears to be composed of ambrein 0.85, an extractive matter soluble in alcohol, and probably containing benzoic acid, 0.025; watery extract with benzoic acid and common salt 0.015; with 0.11 not accounted for.

Ambergris is used as a perfume; and as the alcoholic solution is the most odorous preparation of it, it is generally employed in that form.

AMBERT. [PUY-DE-DÔME.]

AMBLYGONITE occurs massive and in rhombic prisms. Colour greenish white. Cleavage parallel to the sides of the prism. Fracture uneven. Hardness 6.0. Translucent or transparent, in thin laminæ. Specific gravity 3.04. Found at Chursdorf near Penig in Saxony, and at Arendal, Norway. Analysis, by Berzelius:—phosphoric acid, 54.12; alumina, 38.96; lithia, 6.92.

AMBLY'PTERUS (Agassiz), a genus of fossil Ganoid fishes, from the coal formation of Edinburgh.

AMBLYSE'MIUS (Agassiz), a fossil fish, from the oolite of Northamptonshire.

AMBLYU'RUS (Agassiz), a genus of fossil fishes, from the lias of Somersetshire.

AMBOISE, a town in France in the department of Indre et Loire, stands 15 miles E. of Tours, on the left bank of the Loire, which is here crossed by a fine bridge erected in 1822; population 4600. The town stands in a wine district, which from its richness has been called 'the Garden of France.' It has some manufactures of steel and files. There is an ancient castle in Amboise which was formerly the residence of several of the kings of France: it is now the property of King Louis Philippe, who has made great improvements in it, and restored the chapel, which stands in the gardens, and is one of the finest specimens of the florid gothic style in France. It was in Amboise the civil wars on account of religion broke out in the sixteenth century, and here also the epithet 'Huguenots' was first applied to the Calvinists in 1560. (Balbi, *Géographie*; Murray's *Hand-book of France*.)

AMBOISE, CARDINAL GEORGES D', an eminent French ecclesiastic and statesman. He was born in 1460 at the château of Chaumont on the Loire, the seat of his family, which was one of the most illustrious in France. Being a younger son, he was educated for the church, and was made Bishop of Montauban by the time he had attained the age of fourteen. His first preferment at court was given him by Louis XI., who made him his almoner. After the death of this prince, however, in 1483, having connected himself with the fortunes of the Duke of Orleans, he was, with the duke himself, imprisoned for six or seven years afterwards, till the new king, Charles VIII., attained his majority. Soon after being restored to liberty he was promoted to the archbishopric of Narbonne, which, in 1493, he exchanged for that of Rouen. Here he acted as deputy of the Duke of Orleans, who held the office of governor of Normandy, and in that capacity introduced several valuable reforms into the administration of the province. In 1498 the duke became king by the title of Louis XII., and from this time D'Amboise may be considered as prime minister of France. The memorable events of the reign of Louis XII. are connected with the assertion of his rights to the duchy of Milan, and the protracted wars which he carried on in Italy to maintain that claim; but he seems to have entrusted to D'Amboise almost the entire management of the domestic affairs of his kingdom. In this department he displayed equal ability and disinterestedness. By the financial reforms which he effected he was enabled both considerably to reduce the customary imposts, and to supply the heavy demands of the war without any increase of taxation. He exerted himself also, with considerable success, to rectify the existing corruptions both in the law and the church, introducing various regulations, with a view to diminish the length of processes in the former, and by his example as well as by his authority discountenancing the scandalous rapacity of the higher order of ecclesiastics. He would never accept any other benefice in addition to his archbishopric; and even the greater part of his episcopal revenue he distributed among the poor, or devoted to other pious purposes. Very soon after the accession of Louis XII. he had obtained a cardinal's hat, and subsequently the pope appointed him to the high office of legate. But on the death of the infamous Alexander VI., in 1503, it appeared that the chair of St. Peter itself was the place which he aspired to occupy. He failed, however, in this object

through a piece of mismanagement, and the Cardinal de la Rovère was elected pope, with the title of Julius II. No other vacancy in the ecclesiastical throne occurred during the life of D'Amboise, who died in the convent of the Celestines at Lyon, on the 25th of May, 1510. He was buried in the cathedral of Rouen, where his mausoleum is still to be seen. Notwithstanding some faults and weaknesses, D'Amboise was undoubtedly a great benefactor to France. Most of the accounts of his life that have appeared in France are written in the most panegyrical style. One is by an author who calls himself the Sieur des Montagnes, printed in 12mo, at Paris in 1631. Another work, entitled 'A History of the Administration of the Cardinal D'Amboise,' is by the Sieur Michael Baudier, historiographer to his majesty, published in 4to, at Paris, in 1634. The letters of Louis XII. and of Cardinal D'Amboise were published at Brussels in four volumes 8vo. by Jean Godefroy, in 1712.

AMBOYNA, one of the Molucca or Spice Islands, in the eastern seas, is 32 miles long, by about 10 broad. It is nearly cut in two by a deeply indented bay; and attempts have been made to carry a canal across the intervening isthmus.

Amboyna is a mountainous place, abundantly furnished with trees and underwood. The soil is for the most part a reddish clay; in the valleys it is of a darker colour, and mixed with sand. Sulphur is produced among the hills, some of which are encrusted with a copious efflorescence of that mineral. The island is considered healthy, notwithstanding the great heat of the climate. It is remarkable, that eastward of 120° E. long. the moonsoons are directly the reverse of what are experienced westward of that line, so that the weather at and near Amboyna differs much from that of regions not far distant from it. It is only at wet seasons that Amboyna can be said to have any rivers: at other times the streams are not deserving of the name. Four of them, Way Tome, Way Alla, Way Nito, and Bato Gadja, or Elephant's River, which rise in the mountains of Leytimor, and discharge themselves into the sea near the town, are not more than from two to three feet deep during the dry season.

The earliest visit made to Amboyna by any Europeans was in 1511, when the Portuguese traded to, and afterwards took possession of it. They held it till driven out by the Dutch in the sixteenth century; about which time the English East India Company also wished to have a share in the valuable spice trade of this and the other Molucca Islands. From that time to the present, except for a short period during the last war, the island has belonged to the Dutch.

The main object of the different European powers, who endeavoured to possess themselves of Amboyna, was to monopolize the trade in cloves, the cultivation of which spice forms the principal object of industry with the natives. With the desire of keeping the cultivation of the clove-tree completely within their power, the Dutch caused it to be extirpated from every island belonging to them except Amboyna, where they provided for a sufficient production of the spice, by obliging every native family to rear a certain number of clove-trees. In the prosecution of their plans the island was divided into 4000 allotments, each one of which was expected to support 125 trees, and a law was passed in 1720 rendering it compulsory upon the natives to make up the full complement. The number of trees upon the island accordingly amounted to 500,000, the average produce of which exceeded one million of pounds of cloves annually.

Amboyna produces most of the plants found in the neighbouring regions; as also deer, and other useful animals. The inhabitants (aborigines, Malays, Chinese, and Europeans) have one town (Amboyna), which may, however, be considered a Dutch rather than a native settlement. For the other spice islands, see MOLUCCAS.

AMBROSE, SAINT, was born about 340. His father held the high office of prætorian prefect of Gaul, and in this province Ambrose was born, probably at Treves. He was educated at Rome under the ablest masters, and having acquired some distinction as a lawyer, was appointed governor of Liguria. Thus situated, he had reached his thirty-fourth year, when an incident happened which suddenly changed the entire course of his life. In A.D. 374 died Auxentius, the Archbishop of Milan, on which a violent contest immediately arose, as to the appointment of his successor, between the two great parties in the church—the Catholics and the Arians. On the day when the election was to take place, the ferment was so violent, that Ambrose was induced to try what could be done to allay it by his influence with the people; and having accordingly presented himself before them, he addressed them in a speech, recommending the observance of greater order and decorum. The assembly came to a unanimous resolution that Ambrose himself should be placed in the vacant office, although he professed the utmost reluctance to accept the episcopal dignity. He was, however, at last prevailed upon, by the express command of the emperor, to mount the archiepiscopal throne. Although he had been educated in the Christian religion, his baptism had never yet taken place; and he was actually consecrated on the eighth day after undergoing that rite.

The extraordinary piety and zeal of the new archbishop soon rendered him the wonder of the church. But, in addition to his pastoral and other sacred labours, Ambrose acted a distinguished part in the political affairs of his time. While he lived, he was consulted on all great emergencies, both by Theodosius, the emperor of the East, by Valentinian II., the western emperor, and even by the mother of the latter, the Empress Justina, notwithstanding her attachment to the Arian heresy, of which Ambrose was the most determined opponent. The empress was particularly anxious that Ambrose should resign two, or at least one, of the Milan churches to the use of the Arians; but this demand the bishop pertinaciously resisted; and as he was supported in his opposition by the people, Justina soon gave up the contest. It was, according to one account, upon

obtaining this triumph, that St. Ambrose composed the celebrated hymn of thanksgiving, the 'Te Deum Laudamus,' which has long formed a remarkable part of the service of the Roman church, and has also been retained in the church of England liturgy. But it is now allowed by the Roman Catholic critics themselves; that the 'Te Deum Laudamus' is of an age considerably later than that of Ambrose.

Theodosius, the emperor of the East, was one of the most revering admirers of the Archbishop of Milan; but when in 390 Theodosius, carried away by a blind passion, barbarously gave orders for a general massacre of the inhabitants of Thessalonica, by way of punishment for an outrage committed by a few individuals, Ambrose expressed in severe terms to the imperial criminal his abhorrence of an act so inhuman; nor would he again admit him to the communion of the faithful, until he had been subjected to an exclusion of eight months' duration, and had publicly performed penance, in the guise and attitude of a suppliant, in the great church of Milan. Ambrose died at Milan on the 3rd of April, 397; and the great church, from its being made the depositary of his body, received the name of the Basilica Ambrosiana.

The best edition of the works of St. Ambrose is that published in two volumes folio, Paris, 1686 and 1690, by the Benedictine monks. His 'Offices' and several of his other pieces have been translated into English, and there are also French translations of some of them. An able musical critic gives, in the 'Biographical Dictionary of the Society for the Diffusion of Useful Knowledge,' the following account of the connection of the name of Ambrose with the earliest improvement of church music:—The name of Ambrosius is connected with the earliest improvement of church music. The writings of the early fathers concur in recording the employment of music as a part of public worship, although no regular ritual was in existence to determine its precise form and use. This appears to have been first supplied by Ambrosius, who instituted that method of singing known by the name of 'cantus Ambrosianus,' which is said to have had reference to the modes of the ancients, especially of Ptolemy. This is rather matter of conjecture than certainty, although the eastern origin of Christianity and the practice of the Greek fathers render the supposition probable. The effect of the Ambrosian chant is described in glowing terms by those who heard it in the cathedral of Milan. 'The voices,' says Augustine, 'flowed in at my ears, truth was distilled into my heart, and the affection of piety overflowed in sweet tears of joy.' Whether any genuine relics of the music thus described exist at the present time is exceedingly doubtful: the style of singing it may, however, have been preserved; and this is still said to be applied at Milan to compositions of a date comparatively recent.

AMBROSIAN LIBRARY. [MILAN.]

AMBULANCE (from *ambulāre*, to walk or march), a word applied to the carriages serving as moving hospitals, which are attached to every French army or division for the purpose of enabling immediate assistance to be rendered to sick or wounded soldiers. In every European army surgical and medical aid is provided for troops in the field; but it is chiefly due to the humanity of the French surgeons, during the wars of Napoleon, that provision was thus made for the prompt relief of the men who, in an action, were wounded and exhausted.

AMBULATORY, in architecture, the space enclosed by a colonnade or an arcade. In the peripteral temple of the Greeks, the lateral or flanking porticoes are properly termed ambulatories; the cloister of a monastery is surrounded by an ambulatory or ambulatories.

The aisles of the ancient Basilica, and those of the cathedral, or other large church, are sometimes called ambulatories.

AMBUSCA'DE, a military term, derived from the Italian *imboscáta*, something hidden in a wood, and applied to a body of troops disposed so that they may make an unexpected attack on an enemy. In ancient times such attacks were frequent, and generally successful, and they are still so among savage nations; but the vigilance with which the ground about an army, or a column on the march, is now reconnoitred, renders them impossible in modern warfare, or limits them to attempts by small bodies of men to intercept convoys, or foraging parties which are not well protected.

AMELAND, a small island belonging to the Dutch province of Friesland: it is separated from the mainland by a channel called the Watt, and is about 12 miles long. It contains some good pasture land. Some of the inhabitants make lime of the sea-shells found on the coast, and many of them are fishermen. The population is about 3000.

AMEN, a Hebrew word, properly signifying 'firmness,' and hence 'truth,' which has been adopted without alteration in various languages. Its most frequent use is at the conclusion of prayers, thanksgivings, and denunciations, where it is understood to express belief, assent, and concurrence in what has been expressed. Examples of its use in all these cases are numerous in the Old Testament. The word amen concludes all the gospels, and almost all the epistles. Amen is often used by our Saviour at the beginning of a discourse, as an impressive particle, which in our version is rendered 'verily.'

AMENDE HONORABLE. According to the old laws of France, persons guilty of crimes coming under the head of public scandals, were often sentenced to make a public confession of their guilt, which was called making the *amende honorable*. This was accounted an infamous punishment. The courts also might order a person by whom the reputation or honour of another had been injured to make a public acknowledgment of the wrong; and such a sentence carried no infamy with it. It is from this latter custom that the modern and popular use of the expression has been borrowed, according to which we say that a person makes the amende honorable when he publicly admits any wrong which he feels that he has done to another person.

AMENDMENT signifies the correction of mis-

takes in the written records of judicial proceedings of courts of law. In early periods of English history, the pleadings between the parties were conducted orally, or *ore tenus*, as it was technically called, at the bar of the court by their respective advocates. If any mistake occurred in the pleadings of either party, it was corrected at once upon a suggestion made to the court. When pleading *ore tenus* was superseded by the practice of delivering written pleadings from one party or his attorney to the other, it was considered reasonable to continue the same indulgence as to amendments. Hence it has been usual at all times for the courts, upon application made by either party, to amend the interlocutory proceedings in a cause; and at the present day the courts will always amend mistakes in the pleadings, whilst they continue in paper, upon equitable terms. But in ancient times, after the proceedings were once entered on record, the judges considered that they had no authority by the common law to alter them in any respect, however trifling. The consequence was, that after a suit was decided in favour of a party, it frequently happened that his adversary discovered some blunder made by the officer of the court on making up the record; and by bringing a writ of error, he deprived the successful party of all benefit from the judgment which he had obtained. This inconvenient rule appears to have arisen out of a rigid observance of the words of an ordinance of Edward I., which directs the judges to record the pleas pleaded before them, but forbids them 'to make their records a warrant for their own misdoings, or to erase or *amend* them, or to record anything against their previous enrolments.' (Britton, p. 2.) These words obviously imply nothing more than a reasonable restriction upon the alteration of the records of courts of justice clandestinely and for sinister purposes, and do not justify the strict interpretation afterwards applied to them. To the rule, however, thus established there were several exceptions:—1, All errors in records might be amended during the same term in which they were made, because it was said, that in contemplation of law the record is in the breast of the judges during the term, and not on the roll. 2, In an essoign, or excuse by a defendant for not appearing to a writ in proper time, if the plaintiff's name were mistaken, the mistake might be amended, because it was inconsistent with the writ, and, if enrolled in its erroneous form, it would be a record against a previous enrolment, and for that reason a breach of the ordinance of Edward I. 3, For the same reason, a continuance, which is an entry on the record showing the continuation of a cause from one term to another, might be amended so as to make it correspond to the proceedings previously recorded.

In cases which did not fall directly within these exceptions, the judges considered that they were bound by the ordinance of Edward I., and refused to rectify the most palpable errors after the expiration of the term to which the record belonged. The inconveniences of this rigid adherence to the ordinance led to a series of enactments, called statutes of amendment and statutes of *jeofails* (*jeo fail* or *j'ai failli*), by the former of which, authority was given to amend certain specified errors in the records; and by the latter the judges were empowered to proceed to judgment notwithstanding such errors. The first statute of amendment was the 14th Edw. III. c. 6 (1340), which enacted that no *process* should be annulled by a mistake in 'writing one syllable or letter too much or too little.' But the judges construed the word 'process' in the act of parliament strictly, and confined amendments to civil suits, and in them to errors in the entry of the processes for the defendant's appearance and for summoning the jury. If, therefore, a mistake occurred in the entry of the process which was wholly immaterial, it was amended; but if a mistake of a word, syllable, or even a letter, was made by the clerk in drawing up the plea-roll or body of the record, the whole proceedings might be annulled by a writ of error. To remove this gross absurdity, and to enlarge the power of judges in amendments, the statutes 8 Henry VI. c. 12 and c. 15 (1430) were made, by which the judges were authorized, 'in any record, process, word, plea, warrant of attorney, writ, pannel, or return, to amend all that which to them seemed to be the misprision of the clerk;' and also the 'misprisions of sheriffs, coroners, bailiffs of franchises, or other officers in their returns.' Appeals, indictments of treason and felony, and outlawries for treason and felony, were, however, excepted from the operation of the statutes of Henry VI.

The next enactment upon this subject was a statute of jeofails which was passed in 1540 (32 Henry VIII. c. 30). This was followed by the statute 18 Eliz. c. 14 (1572), the 21st Jac. I. c. 13 (1623), and the 16th and 17th Car. II. c. 8 (1665). These statutes were calculated almost exclusively to aid imperfections in form after the verdict of a jury. The 4 Anne, c. 16, extended the operation of the statutes of jeofails to all cases of judgment by confession or default.

A great improvement was introduced by the statute of 9 Geo. IV. c. 15; which enabled 'any court of record in civil actions, any judge at *Nisi Prius*, and any court of oyer and terminer and gaol delivery, if such court or judge should see fit so to do, to amend the record upon the appearance of a variance between any matter in writing or in print produced in evidence, and the recital thereof upon the record.' In criminal cases the statute 7 Geo. IV. c. 64, s. 19, authorizes the court, upon a dilatory plea by the defendant of mismomer, or of a want of addition, or of a wrong addition, to amend the indictment or information according to the truth, and then to proceed with the trial upon the merits of the case, as if no such dilatory plea had been pleaded.

A frequent failure of justice by means of minute objections was the consequence of the exclusion of criminal cases from the beneficial operation of the statutes of amendments and jeofails: to remove this evil, a kind of general statute of jeofails, applicable to criminal pleadings, was introduced in 1826, in order, as the preamble states, 'that the punishment of offenders might be less frequently intercepted in consequence of technical niceties.' This statute (7 Geo. IV. c. 64, s. 20)

provides 'that no judgment upon any indictment or information, for any felony or misdemeanor, whether after verdict or outlawry, or by confession, default, or otherwise, shall be stayed or reversed for want of the averment of any matter unnecessary to be proved.' It then proceeds to specify a variety of defects, both of omission and imperfect statement, and enacts that an objection founded on the appearance of such defects upon the record shall not have the effect of staying or reversing the judgment of the court.

AMENDMENT. [BILL IN PARLIAMENT.]

AMENTA'CEÆ, a name sometimes given to a number of forest trees found chiefly in the north of Europe, Asia, and America, the flowers of which are arranged in a dense, cylindrical, deciduous spike, called by botanists an *amentum*. Such are the poplar, the birch, the hazel, the willow, the oak, and many others. But as their genera are in fact constructed in very different manners, amentaceæ are more correctly separated, by modern botanists, into several different orders, for which see CORYLACEÆ and SALICACEÆ.

AMERCEMENT. When courts of justice impose a pecuniary penalty on offenders, it is termed a *fine*, or an *amercement*, according to the nature of the offence and the authority of the court. The difference between them is not merely nominal, though perhaps at present not of much practical importance. The remedy for the recovery of the amercement is by action, or by distress on the personal property of the offender; but for recovering a fine, the process is by arresting the delinquent.

If the offence amounts to a breach of the peace, or to a contempt of the king's courts, or other similar misdemeanor, a fine is the ordinary punishment, the amount of which is in the sole discretion of the judge. If the offence is of a lighter character, or is the subject of a proceeding in certain inferior courts, the party is punished by being amerced, and is said to be *in misericordiâ*, or, 'at the mercy' of the court. In the latter case, the court has no further authority than to adjudge that *some* amercement shall be inflicted on the party; the *amount* of it is left to be assessed (or, in technical language, *affeered*) by persons whose character is analogous to that of a jury. Such parts of the subject of amercement as are obsolete, are explained in the works referred to at the end of this article.

(Bacon's *Abridgment*, tit. *Fines and Amercements*; Stephen, *New Commentaries*, iii. 619, 636, iv. 442.)

AMERICA.—*Progress of Discovery.*—Various traditions, and allusions made by the early Icelandic authors, led a few years ago to an opinion, that America was known to Europeans as far back as five centuries before the time of Columbus. The Royal Society of Northern Antiquaries at Copenhagen commenced a search among Danish, Norwegian, and Icelandic manuscripts; and the result, published in 1837, leaves no doubt that the Scandinavians knew and visited the coast of America above eight centuries ago. Biarne Heriulfsen made a voyage from Iceland to Greenland in 986. Leif Ericsen and Tyrkes voyaged along the same coast in A.D. 1000. Thorwald Ericsen extended these researches in 1002. Three vessels, commanded by Thorfinn, were engaged in exploring along the coast from 1007 to 1010; and a year afterwards another expedition sailed from Iceland to America. There seems also evidence that about the same time the natives of the Orkneys and of Ireland had made settlements on the coast of America further to the south. By the year 1266 we find that the Danes, settled peaceably at Greenland, voyaged from thence as far north as 75° N. lat., near the spot now called Barrow Strait. In 1285 Newfoundland was visited by two Icelandic missionaries, Odalbrand and Thorwald Helgason. All these points are now based on tolerably sure ground, and are evidence that the Scandinavians visited America long before Columbus; a fact, however, which was not known to Columbus or any of his contemporaries.

During the latter part of the fifteenth century there was an ardent spirit of discovery in Europe, the principal object of which was to find a passage by sea to the East Indies. [AFRICA.] In this state of things a project was formed by Christopher Colomb, or Columbus, a citizen of Genoa, to sail westward to the Indies,—an idea which shows Columbus's knowledge of the figure of the earth to have been superior to the general notions of his age. For a notice of the difficulties he underwent, we refer to COLUMBUS. In his first expedition, made in 1492, he discovered San Salvador, Cuba, Hayti, and other islands of the West Indies, which he so named in ignorance that the vast Pacific intervened between them and India proper. In the next expedition Columbus discovered Jamaica. In a third, his discoveries included Trinidad, and the coast of South America near the Orinoco. The success of Columbus soon gave encouragement to private adventurers to the new world, one of the first of whom was Alonzo de Ojeda, who, in 1499, followed the course of Columbus to the coast of Paria, and, standing to the west, ranged along a considerable extent of coast beyond that on which Columbus had touched, and thus ascertained that this country was part of the continent. Amerigo Vespucci, a Florentine gentleman, accompanied Ojeda in this voyage, and having had a chief share in the direction of it, and having published an account of it on his return, the country of which he was supposed to be the discoverer came gradually to be called by his name, and by universal usage the name of *America* has been bestowed on this new division of the globe. It is now too late to redress the injustice which has received the sanction of time.

In 1497, while Columbus was engaged in his researches, the coast of North America had been reached by an English vessel, commanded by Giovanni Gaboto, or Cabot, a Venetian settled in Bristol, who undertook an expedition in company with his son Sebastian, and explored a long line of the North American coast. [CABOT.] In 1498, Sebastian Cabot, in another expedition, visited Newfoundland. In 1500, Gaspar Corterecal, a Portuguese, touched at Labrador; and Brazil was accidentally discovered by a Portuguese fleet under Cabral. The coast of the province of Tierra

Firma, from Cape de Vela to the Gulf of Darien, was first visited by Bastidas, a Spaniard, in 1501. Yucatan was discovered by Diaz de Solis and Pinzon in 1508, and Florida by Ponce de Leon, in 1512. In the same year, Sebastian Cabot reached the bay since called Hudson's Bay. The Pacific, or Southern Ocean, was first seen from the mountain tops near Panama, by Balboa, in 1513; and, two years after, a landing was effected on the south-east coast of South America, about the mouth of the Rio de la Plata, by De Solis, who, as well as several of his crew, was killed, roasted, and eaten by the natives. The Spanish government, which had been foremost in discovery, was the first also to make conquests in America, early in the sixteenth century. Fernando Cortez was dispatched to subdue Mexico, the most powerful state in the new continent. Notwithstanding the efforts of its chief, Montezuma, it soon fell under the dominion of Spain, and this conquest was followed by another almost equally valuable—that of Peru, whose subjugation to the Spanish yoke was effected by Pizarro.

The French now began to participate in the zeal for adventure, and in 1524 an expedition was dispatched by Francis I., under Giovanni Verazzano, a Florentine, who surveyed a line of coast of seven hundred leagues, comprising the United States, and part of British America. But in 1508 Aubert, a Frenchman, had already discovered the St. Lawrence River. Jacques Cartier, also a Frenchman, in 1534 nearly circumnavigated Newfoundland, and entered the Gulf of St. Lawrence. In his second voyage, the next year, Cartier sailed up the St. Lawrence to the habitation of Hochelagen, near the site of Montreal, and brought away a native king to France. The coast of California, on the west side of the northern division of the continent, was discovered by Ximenes, a pilot, who had murdered Mendoza, a captain, dispatched by Cortez on a voyage of discovery; the Gulf of California, or Sea of Cortez, was first entered by Francisco de Ulloa, another captain sent out by Cortez in 1539. The Spaniards subsequently undertook several unsuccessful voyages, but they did not abandon their hopes, and at the close of the sixteenth century Sebastian Viscaino advanced along the coast of New Albion as far as the Oregon, or Columbia River. [Albion, New.]

Colonization in North America by England commenced in the time of Queen Elizabeth. Sir Humphry Gilbert was the first to attempt it, though he merely took formal possession of Newfoundland, in 1583; his half-brother, the celebrated Sir Walter Raleigh, in 1584 dispatched an expedition which discovered the country then called Virginia, and he made several attempts to colonize it without effect. The colonies of Virginia and New England were respectively planted in 1607 and 1620, under James I., and it is not a little remarkable that one hundred and six years elapsed after North America was first visited by Cabot, before a single Englishman had effectually settled in the country.

Within the last half century many exploring parties have traversed the interior regions of America. The United States' government, on becoming possessed of Louisiana in 1803, dispatched Captains Lewis and Clarke to explore the regions west of the Mississippi. They traced the whole course of the Missouri to its source, and made a map of the adjacent regions. Mr. Dunbar and Dr. Hunter explored Red River in 1804. General Pike, in 1805—1807, made many researches west of the Mississippi. In 1819 Major Long explored a wide range of country included between the Mississippi, the Missouri, and the Arkansas; and in 1823 the same officer, accompanied by others, examined much of the region westward of the great Canadian lakes.

British researches in North America have been chiefly directed to the examination of the western coast, under Cook, Clarke, Meares, Vancouver, &c.; and to arctic or north-west expeditions. During the reign of Henry VIII. attempts were made by the English to find the north-west passage to India, without success; and, in the next reign, Sir Henry Willoughby failed in search of a north-east passage. Three successive voyages in search of the north-west passage were made in the reign of Elizabeth, by Martin Frobisher, who, in 1576, and the two following years, explored Labrador and Greenland, but without any further result. Among our early north-west voyages of discovery may be mentioned those of Davis, in 1585; of Weymouth, in 1602; of Knight, in 1606; of Hudson, in 1610 (from whom is named the great inland sea called Hudson's Bay and the river of New York); of Button, in 1612; and of Bylot and Baffin, in 1615, from the latter of whom Baffin's Bay has been named. Nothing more was done till 1772, when Richard Hearne travelled from Hudson's Bay to the Frozen Ocean, and discovered Coppermine River. In 1793 Alexander Mackenzie traced the Mackenzie River to its mouth in the Frozen Ocean, and also crossed the Rocky Mountains to the Pacific. In 1818 the British government commenced that series of expeditions which, aided by the Hudson's Bay Company and by private enterprize, and conducted by Parry, John and James Ross, Lyon, Franklin, Richardson, Beechey, Scoresby, Dease, Simpson, and Back, have resulted in those interesting discoveries, for a notice of which we refer to Polar Regions, North.

The exploratory researches in South America have not been so numerous as in the north; but some of them have been of great value. De la Condamine, Godin, and other men of science, were sent out by the French and Spanish governments, in 1735, to measure an arc of the meridian in South America. The results of this expedition, published by Ulloa in Spanish, and by Condamine in French, added largely to the existing knowledge of South America. But of far higher value were the researches of Humboldt and Bonpland between 1799 and 1804. During this period they traversed the country from Mexico to Lima, and accumulated vast stores of information. Bonpland started from Buenos Ayres on another expedition into the interior in 1818. About the same time, Dr. Spix and Dr. Martius

commenced a laborious series of researches in Brazil; and the South American states, on establishing their independence, sent out various expeditions of a minor kind.

Various books of travels, and the Journal of the Geographical Society, London, show that research has been active in America within the last few years. Between 1828 and 1835, Smyth, Mawe, and Pöppig, explored the Amazon River. Belcher and Kellatt have explored the western coast; while Fitzroy, King, and Darwin, have added to our knowledge of the south-eastern, southern, and south-western coasts. Wrangel has described Russian America. Captain Fremont, of the United States, has made two expeditions to California and the Rocky Mountains. Farnham and others, in Oregon; Schomburgk, in Guayana; Jukes and Bonnycastle, in Newfoundland; Norman and Stephens, in Yucatan; Owen and Allen, along the east coast of Central America; and various surveys along the coast, by Barnett, Bayfield, and Hassler—all have added largely to the authentic details of America within the last few years.

Physical Geography.—America is the most elongated of the great divisions of the globe. It is bounded on the N. by the Icy Sea; on the E. by the Atlantic; and on the W. by the Pacific. Its length from the northern latitude of 70° to 56° S. lat., may be considered as exceeding 9000 miles, though it cannot be accurately stated; its breadth upon an average is about 2000 miles; its widest part extends from about 55° to 168° W. long. The extent of surface has been variously stated. Hassel has given it at 17,303,000 sq. miles, and Balbi at 14,622,000 sq. miles, but in every estimate allowance must be made for the uncertainty of the northern limits, and our still imperfect acquaintance with the form and position of some coasts. Berghaus makes the area about 14,219,967 square miles, not reckoning the islands, to which he assigns an area of about 98,660 square miles, which is certainly too little. The most southern point is Cape Horn, near the Island of Tierra del Fuego. The two great portions which are called North and South America, are united in 9° N. lat. by the Isthmus of Panama, which, in the narrowest place, is not more than thirty miles wide.

The physical characteristics of these two great divisions may conveniently be treated separately.

1. *North America.*—The form of North America has sometimes been compared to that of a triangle, with the vertex terminating at the Isthmus of Panama, and the base determined by the shores of the Frozen Ocean. The extent of coast is very great, owing to its form: the length of coast from Hudson's Straits to the Florida Channel is about 4800 miles; and measured from the Florida Channel along the Gulf of Mexico to Panama, about 4500. The whole length on the Pacific side, from the most southern point to Behring's Straits (including the Gulf of California), has been roughly given at 10,500 miles.

The coast of North America is more indented by seas and large inlets on the eastern than on the western side. Davis' Straits and Baffin's Bay, with the Icy Ocean, may be considered as separating Greenland and the Polar lands from the American continent, to which Greenland can scarcely be considered as belonging. Hudson's Bay with the Atlantic and Gulf of St. Lawrence bound on three sides the extensive and inhospitable peninsula of Labrador. Southward of the St. Lawrence is the deep hollow of the Bay of Fundy. The coast of America, between the Bay of Fundy and the Gulf of Mexico, is not marked by any very considerable indentation, except the Chesapeake Bay, which runs from south to north about 180 miles, with an average breadth of about thirteen miles.

If the islands that lie stretched in an irregular line in front of the Gulf of Mexico and the Caribbean Sea were united with one another and with the main land—a state of things that we have no difficulty in imagining to have once existed—we should have a large internal sea analogous to the Mediterranean. Between 10° and 25° N. lat. we find the eastern limits of this great inland sea; but as we advance into it towards the west we find it scooped out into various basins, such as the Gulf of Mexico, the Bay of Honduras, and the Caribbean Sea.

The western coast of North America presents no very deep and extensive indentations as we advance northwards from the Bay of Panama, till we come to the immense Gulf of California, about 800 miles in length, and from sixty to eighty miles in average width, formed by the main land and the long narrow peninsula of California. Between the latitudes of 47° and 60°, the west coast of North America is exceedingly irregular, presenting a great number of islands, some of considerable extent, and forming with the main land numerous bays and creeks. Farther north we find between Cook's Inlet and Prince William's Sound an extensive peninsula running about 200 miles from north-east to south-west; and west of this the remarkable long narrow peninsula of Alashka, or Alyaska. The straits which take their name from the navigator Behring separate Asia from America by a channel about 48 miles wide in the narrowest part.

The mountain system of the Americas is remarkable for presenting some of the longest lines of elevated surface in the world. The Rocky Mountains may be viewed as a continuation of the high lands of Central America and of Mexico. They separate the waters of the Missouri and its tributaries from the rivers which flow into the Pacific. [ROCKY MOUNTAINS.] Extending northward from Oregon towards Behring's Straits are other but less known mountains; among which, at about 60° N. lat., are Mount Fairweather and Mount Elias, rising respectively to the heights of 13,824 and 16,938 feet.

The mountain system of the eastern side of the North American continent, called the *Appalachian*, stretches from about 34° N. lat. northwards to the banks of the St. Lawrence. This range is described under APPALACHIAN MOUNTAINS; but a good idea of this region of America may be formed by considering it to be divided into three portions by the Appalachian

and Rocky Mountains; and that the rivers which lie east of the former flow into the Atlantic; those which rise west of the latter flow into the Pacific; while those between the two form the great basin of the Mississippi.

The great valley of the Mississippi drains a surface perhaps inferior to that of no river on the globe. Its two greatest rivers are described elsewhere [MISSISSIPPI; MISSOURI]. The following are the lengths of some of the chief branches of the Mississippi.

	Miles.
Missouri to its confluence with the Mississippi	3000
Mississippi to its confluence with Missouri	1200
Mississippi from the confluence of the Missouri to its mouth	1265
Entering on the west side—	
The Arkansas	2000
Rio Rojo (Red River)	1500
On the east—	
Ohio, to the junction of the Mississippi	980

These lengths are given according to Darby; but all such estimates are open to much error.

When America was first discovered, a large part of it consisted of one vast forest, extending nearly from the Atlantic to the Mississippi, and from the Canadian lakes to the Gulf of Mexico—2000 miles in length, with an average breadth of 1000. Most of this vast forest yet remains; but the tract west of the Mississippi contains extensive plains. These wide-spreading steppes are devoid of trees, are parched in summer by scorching heat, and in winter the winds from the Rocky Mountains sweep over them with an intensity of cold almost beyond belief. The spacious and dry plains of northern Texas and the upper regions of Arkansas present a character analogous to the high plateaus of the Asiatic continent, and here the white man adopts those pastoral habits which are the only mode of life suited to the regions which he occupies. Stretched along the base of the Rocky Mountains, with an average width of five or six hundred miles, we find a country, which is emphatically called the desert. The lower parts of the Mississippi valley, with a portion towards the north, are still covered with a dense forest, spread interminably like an ocean. The *prairies* of this valley are found both on the east and west side of the channel of the river; they are extensive, elevated, and generally irregular tracts, without trees, though sometimes capable of producing them, covered in the spring with countless flowers and long grass, and often possessing a deep rich soil.

The basin of the Mississippi, and the United States, are bounded on the north by the grandest series of lakes in the world—lakes Superior, Huron, Michigan, Erie, and Ontario; together with their splendid outlet, the River St. Lawrence. It will be sufficient here to refer, for descriptions of them, and of the rivers of North America generally, to such articles as CANADA; NORTH-WESTERN TERRITORY; OREGON; UNITED STATES; and the names of the lakes and rivers themselves. The physical characteristics of the cold region lying north of the Great Lakes are described under BRITISH AMERICA; HUDSON'S BAY; NORTH-WESTERN TERRITORY; POLAR REGIONS, NORTH; &c.

It is a fact, well ascertained, that the average temperature on the west coast of North America is higher than on the eastern. In the Oregon valley it is said to be higher than in corresponding latitudes on the Atlantic coast, by an amount equivalent to five or six degrees of latitude; and the winters are also much moister. The North-Western Territory, east of the Rocky Mountains, is a cold and inhospitable region, not adapted for agriculture. On the eastern part of the continent agriculture has not advanced farther than the latitude of 51° or 52°; but the limit of successful cultivation, at the present day, must not be taken as the limit which cannot be passed. The cold within the United States increases as we advance westward on the same parallel; and this is independent of elevation.

2. *South America.*—The Andes form the great mountain system of South America, extending from the Isthmus of Panama to Cape Horn. [ANDES.] There is a certain analogy between North and South America as to its mountain chains. The axis of the two mountain systems, in each case, approaches the western shore much more closely than the eastern; but in South America this is yet more observable than in North America. The form of South America may be comprised within a sort of triangle; of which the north-west point is the Isthmus of Panama; the north-east, Cape St. Roque (5½° S. lat., 35½° W. long.); and the south, Cape Horn (56° S. lat., 67½° W. long.).

The northern coast-line of South America, bounded by the Caribbean Sea, and the southern and south-west coasts, near Tierra del Fuego and Patagonia, are much indented and very irregular; but in other parts the coast-line is tolerably free from breaks. The Pacific washes nearly 6000 miles of the coast.

The Rio de la Plata flows in a great central valley, running from north to south, which may be compared with the valley of the Mississippi; while the Amazon is the great drain of the low lands that stretch from the Andes to the Atlantic, and may be compared with the St. Lawrence of North America. Besides the offsets that shoot out from the Andes, we find in South America several distinct mountain systems. One of these is the Venezuela chain, which runs eastward from the Andes towards the Atlantic. This Venezuela range, with the high land of Guayana, form on two sides the boundary of the immense basin watered by the Orinoco; while the region westward of the Orinoco is watered by the Magdalena; and that to the east by the Essequibo, and other rivers. Between the Andes and the high lands of Brazil lies the extensive plain drained by the Plata; and between the mountains of Guayana and those of Brazil lies spread the immense level that belongs to the lower course of the Amazon.

The main mountain mass of the Brazilian system lies between 18° and 28° S. lat., and consists of several parallel chains with a length of about 700 miles, and a breadth of 400. It does

not appear that any mountain system stretches across, and connects these high lands of Brazil with the Andes; consequently the waters of the Paraguay are separated from the southern tributaries of the great Amazon by a water-shed of no great elevation. In no other part of the world do we find three such basins as those of the Orinoco, Amazon, and La Plata, separated by such slight elevations. From the basin of the Amazon to that of La Plata, it is not probable that the ascent is greater than from the upper waters of the Mississippi to the level of the Canadian sea.

The particulars of the chief rivers are given under AMAZON; BRAZIL; GUAYANA; ORINOCO; PLATA; PARAGUAY; &c.; but the following comparative view may be here useful:—

	Miles.
The length of the Amazon . .	3300
Its tributaries, viz.	
Ucayali	1350
Yutai	750
Jaura	750
Madeira	1800
Topayos	1000
Xingu	1080
Napo	800
Rio Negro	1400
The Parana, or Rio de la Plata .	2130
Its tributaries, viz.	
Paraguay	1200
Pilcomay, Vermejoo } tributaries of the preceding	1020
	660
Salado	750
Uraguay	660
The Magdalena	750
The Orinoco	1440
The Essequibo	400
The Tocantin	1500
The Parnaiba	700
The San Francesco	1275
The Cusu Levon, or Negro . .	540
The Moyale Levon, or Colorado	1080

The South American lakes are not numerous; and being, in many cases, caused by the overflowing of the immense rivers, they appear in the rainy season, and are dry in the summer. The Lake of Maracaibo, into which the waters of the Gulf of Venezuela enter at high tides, is 120 miles long and 90 wide. The Lake of Titicaca, situated high in the Andes of Peru, receives the waters of numerous streams, but has no visible outlet.

South America presents the most striking contrasts of lofty mountains and extensive plains in the whole world. It exhibits also a no less remarkable variety of climate, from the summit of its snow-clad mountains to the low burning level of its interminable plains; from the woodless plateaus of Quito and Potosi, where the moderate temperature and even the cold of a northern climate are felt at elevations ranging from 8000 to 12,000 feet above the level of the sea, to the low flats of the Orinoco, the Essequibo, and the Amazon, covered with forests which almost exclude the light of day, adorned with all the magnificent foliage of a tropical climate, and swarming with almost endless forms of animal life.

The great plains, called in the native language *Pampas*, and by the Spaniards *Llanos* (levels), may be, in some respects, compared with the prairies of the northern continent and the high levels of the Arkansas. [PLAINS.] They occupy a great area in the provinces of La Plata and Patagonia. Southward of these plains is the rugged region of Patagonia and Tierra del Fuego, one of the most inhospitable parts of South America.

The phenomenon of earthquakes is now exhibited in South America with more activity than in any other quarter of the world; nor is North America free from them, though their sphere of action appears to be, perhaps, more limited, and their effects less terrible. The great earthquake which, on March 26, 1812, laid Caracas and La Guayra in ruins, was felt near New Madrid on the Mississippi. But in South America, earthquakes are matters of ordinary occurrence; though, we believe, they are always within the more immediate sphere of the Andes. On the eastern coast of America they seldom occur.

The climate of South America necessarily varies with the extent of latitude which the continent traverses. The latitude, however, is only one of the causes of the variations of temperature. The extensive and lofty mountain-chain [ANDES] has a powerful effect both on the heat and the moisture of South America. As to temperature, its variations are very wide — from a freezing temperature in the winter at Tierra del Fuego, to an average winter temperature of 64° at Caracas; while the summer temperature varies yet more considerably.

South America is rich in mineral produce. Gold is found in New Granada, Peru, Chili, La Plata, and Brazil; and diamonds have been for some time a part of the Brazilian exports. The silver mines in Peru are very rich, and in Chili there are mines of silver, lead, and sulphur; those of copper are still more abundant. There are mines of iron, sulphur, antimony, tin, lead, copper, and quicksilver, in Brazil; but the pursuit of the precious metals appears to have diverted attention from other mining speculations. America also sends to Europe pearls and other precious stones.

Inhabitants.—The native Americans constitute, at the present day, by their physical characters not less than by their languages, a race different from those known before the discovery of America. They are, in general, of a robust frame and a well-proportioned figure. Their complexion is of bronze, or reddish copper hue—rusty-coloured, as it were, and not unlike cinnamon. Their hair is black, long, coarse, and shining, but not thickly set on the head. Their beard is thin, and grows in tufts. Their forehead is low, and their eyes are lengthened out, with the outer angles turned up towards the temples; the eyebrows high, the cheek-bones prominent; the nose a little flattened, but well marked; the lips extended, and their teeth closely set and pointed. In their mouth there is an expression of sweetness, which forms a contrast with the harsh character of their countenance. Their head is of a square shape, and their face is broad, without being flat, and

tapers towards the chin. Their features, viewed in profile, are prominent, and deeply sculptured. The Esquimaux of the North are below the average height, while the Patagonians and a few other tribes are above it.

The copper or bronze hue of the skin is, with some slight exceptions, common to almost all the nations of America; it varies from a light brown in New Granada, to a very dark tint in some parts of Guayana. It was formerly supposed that the Americans were without beards, and certainly there are many among them who have neither beard nor hair on any part of their person except the head. But the Indians who inhabit the torrid zone and South America have generally a small beard which becomes longer by shaving; and among the Patagonians there are many who have beards.

These physiological characters, according to some opinions, appear to establish an affinity between the Americans and the Mongol race of Asia, as well as the Malays and others; but the resemblance does not extend beyond mere colour, and cannot apply to the more essential parts—the cranium, the hair, and the profile. The great number of separate languages proves that a considerable portion of the American tribes have long existed in that savage solitude in which they are still plunged. Dr. Von Martius ('London Geographical Journal,' vol. 2) has ascertained the names of more than 250 tribes, some of them consisting of very small numbers, in the interior of Brazil alone.

In regard to the origin of the Americans, numerous conjectures have been formed. It has been supposed by one writer, that America was peopled from the dispersion of the Israelites—by another, that the Egyptians were the ancestors of the Mexicans—by some that the Carthaginians—and by others, that the ancient Celts, made expeditions to America. Grotius has derived the North American population from the Norwegians; and the theory of the purely Asiatic origin of the Americans has met with numerous supporters. In fact, the state of our knowledge is not such as to warrant us in coming to any certain conclusion on the subject. America presents, both in the northern and southern continents, traces of the labour of man which perhaps belong to no race that inhabited the continent at the time of its European discovery. These ancient monuments are described under MEXICO, OHIO, PERU, and YUCATAN. If we have learnt nothing else from inquiries into the history of man in America, we have learnt at least to reject the unfounded hypothesis of the very recent peopling and formation of that continent. On comparing the most accurate descriptions of the existing natives of widely-separated parts of this continent, we find some most marked differences both in physical appearance, manners, language, and knowledge of the useful arts. It is only of late years that the study of the native races of America has been prosecuted in a manner likely to lead to accurate knowledge of facts. It is only when the white man has destroyed or debased a large portion of the inhabitants of the New World, that he begins to inquire with more eager interest into the character and history of his predecessors in the possession of the soil. Races of men have undoubtedly disappeared before the civilizing influence of the white man, even in Europe; and the same process has taken place in the New World, and is now taking place in other countries. Thus, too, in North America, where the exclusive habits of the white colonist are intolerant of all modes of life but that which he prescribes, the Indian and he are mutual enemies; and the disappearance of the aborigines has regularly continued, till, from the Atlantic to the Appalachian system, scarcely a vestige of the primitive races worth noticing is found; from the Appalachian to the borders of the lower Mississippi the same history is rapidly in progress; and the western limits of the white man's rule must be the rude plains which he cannot cultivate. The islands of the Columbian Archipelago (West Indies) present the singular spectacle of a whole race of people that has disappeared within the limits of recent and authentic history: their place is occupied by the white man of Europe as the master, and the black man of Africa as the slave, or the labourer.

The European settlers have been, in North America, principally the British, with a considerable number of French and Spaniards, some Dutch, Swedes, and, especially in the State of Pennsylvania, U. S., a considerable number of Germans; in South America, the Spaniards and Portuguese have been the chief settlers, with some Dutch and English.

The population of the western hemisphere has been thus distributed:—

Whites	13,500,000
Indians	3,600,000
Negroes	6,500,000
Mixed races	6,500,000
	35,100,000

and by another computation according to languages, the division is as follows:—

Speaking the English language	11,647,000
Spanish	10,174,000
Portuguese	3,740,000
French	1,242,000
Dutch, German, Danish, Swedish, and Russian	216,000
Indian languages	7,543,000
	34,562,000

But these estimates are necessarily very loose.

Zoology.—The vast continent of America, stretching from the arctic circle almost to the antarctic, presents us with natural productions which vary from those adapted for a cold climate to those which are peculiar to the intertropics. Looking at its indigenous mammalia, we cannot but perceive that while some forms are abundant, others are very restricted. For example, the only extant indigenous terrestrial Pachydermata * are two species of tapir, and two species of peccary.

* The Lamartin or Manatee, classed by some among the whales, but which is in reality an aquatic pachydermatous animal, of herbivorous appetite, inhabits the mouth of the large rivers of South America.

At some remote epoch, indeed, huge Pachydermata, and among them the gigantic *mastodon*, abounded in the wilds of America; but they have passed away, their relics alone attesting their former existence.

South America is rich in Edentate animals, the sloth, the ant-eater, the armadillo, the chlamyphorus; but these are only the pigmy representatives of a race of gigantic *Edentata*, the *megatherium* and the *mylodon*, contemporary with the *mastodon*, and alike extinct. Rodents are numerous; they abound, and it is in America that the largest species of this order, the capybara, exists. The numerical ratio of the Rodents is in strong contrast with that of the ruminantia. There are no *true* antelopes, for the prongbuck of the Rocky Mountains cannot be considered as such. In North America we find the bison, the musk ox, the reindeer, the wapiti, the Virginian deer, the elk, the long-tailed deer, and the black-tailed deer of the Rocky Mountains; the Californian sheep, and the Rocky Mountain goat. Several species of deer are peculiar to South America, but, after all, the species are not numerous, and the indigenous Ruminants may be summed up in a brief catalogue. The most remarkable forms of this order are the llamas, alpacas, and vicuñas, which tenant the craggy Andes. Long previously to the arrival of Columbus, the llama was domesticated and used as a beast of burden by the natives; its wool was manufactured into cloth, and its flesh supplied a wholesome food. Among the Rodents many are valuable as fur-bearing animals; of these we may notice the beaver, the musquash (*Ondatra zibethica*), the coypu (*Myopótamus coypus*), various species of squirrel, and the chinchilla of Peru and Chili. Many thousand skins of the beaver, of the musquash, and of squirrels, are annually imported into England from the northern regions of America, and an extensive trade in the skins of the coypu, improperly called *nutria* or otter, and also in those of the chinchilla, is carried on at Buenos Ayres. The capybara, the agoutis, the pacas, belonging respectively to the genera *Hydrochærus*, *Dasyprocta*, and *Cœlógenys*, are forms peculiar to South America; as is also the prehensile-tailed or Brazilian porcupine called cuandu (*Synætheres prehensilis*). In North America the urson, or hairy porcupine (*Erethizon dorsatum*), is common. Various species of hare (*Lepus*) and of murine animals are abundant, and extensively spread. Of the insectivorous mammalia, several species of shrews (*Sorex*) are American; and the genera *Scalops* (shrew-moles), and *Condylura* (animals representing the mole), are peculiar to this continent.

America is rich in Carnivora; wolves, foxes, and feline animals are numerous; among the latter, the jaguar (*Felis onça*) and the puma (*Felis concolor*) are the most formidable. Several species of bear exist; in the north the Polar bear (*Ursus maritimus*), the barren-ground bear (*Ursus arctos Americanus*), the black bear (*Ursus Americanus*), and the ferocious grizly bear of the Rocky Mountains; the spectacled bear (*Ursus ornatus*) inhabits the chain of the Andes. Bears are hunted by the fur traders for the sake of their skins, as are also various foxes, ermines, martins, polecats, wolverines or gluttons, lynxes and others. We may also mention the racoons, the coati-mondis, the kinkajou, and the mouffettes (*Mephitis*) as forms peculiar to America. Of the American bats or Cheiroptera, the most remarkable are the blood-suckers, or vampires (genera *Vampirus*, *Desmodus*, &c.). These bats live upon the blood which they suck from men and animals while asleep; they generally fasten upon the ears, shoulders, or haunches of horses, mules, &c., but on the feet of the human subject. They are much dreaded, but the stories told respecting them are greatly exaggerated. Azara says that fowls bitten by these bats, the comb or wattles being the parts mostly attacked, very often die, but rather from gangrene supervening than from positive loss of blood. There are no frugivorous bats or roussettes (*Ptéropus*) in America.

The vast forests of the warmer regions of South America abound with Quadrúmana, or monkeys, but all of a distinct type from any known in the Old World. Many of these have strongly prehensile tails, as the slender-limbed spider-monkeys (*Ateles*), the howlers (*Mycetes*), and the sapajous (*Cebus*). In the sagoins and sakis (*Pithecia*) the tail is long, often bushy, never prehensile. Those elegant little monkeys called ouistitis, or marmozets, are all South American. Monkeys are relished by the natives as food.

Though Australia appears to be the head quarters of the Marsupial animals, one extensive group (*Didelphis*), including the opossums, and a genus (*Chironectes*) containing an aquatic opossum, called the yapock, are peculiar to South America, including Mexico and the southern provinces of the United States. This coincidence in the zoology of two such distant continents, of which the productions of one are so peculiar, is perhaps one of the most extraordinary circumstances in the whole geographical distribution of mammalia. In Australia all the mammalia, with the exception of some rodents, and bats, and the Dingo dog, are marsupial; such is not the case in America; the opossums constitute but a small proportion of its indigenous quadrupeds, and all belong, the yapock excepted, to one generic form. Of the Cetaceous animals nothing need be said,—they roam the seas.

America now contains horses, horned cattle, sheep and goats, but these have been all introduced since the time of Columbus. Horses and cattle exist in many parts of South America in great numbers, and wild herds roam the plains. They abound also in Mexico, and the great prairies of the western portions of North America.

The Ornithology of the New World is very interesting: rapacious birds, as vultures, eagles, hawks, and owls are numerous. Of these we may mention the great condor of the Andes, the Californian vulture, the king vulture, the harpy eagle, the white-headed eagle, the golden eagle, the great Virginian owl. The woods abound in parrots and macaws; woodpeckers, trogons, of gorgeous beauty, and toucans, are natives of the hotter regions; and brilliant humming birds dart

from flower to flower. Of the gallinaceous tribe, the common wild turkey, the splendid Honduras turkey, curassows and guans, supply the place of the peafowl, the common fowl, and the Guinea fowl. The turkey is now common throughout most parts of Europe, and though we have not yet naturalized the curassows and guans, they are domesticated in some parts of South America. The genus *Ortyx* represents the partridges of the Old World. In the north there are various species of grouse, and pigeons are in multitudes. Two species of rhea, or American ostrich, tenant the plains of South America. Of wading birds, the scarlet ibis and the American flamingo are conspicuous for the splendour of their plumage. Aquatic birds abound, various species of swans, geese, and ducks, frequent the lakes, rivers, and coasts of America; one species, the canvas-backed duck, is celebrated for the delicacy of its flesh, and another, the summer duck, for its singular beauty. Various species of penguin breed on the coast of California; these remarkable birds, which use their flipper-like wings as oars, are peculiar to the southern hemisphere.

The Reptiles of America are numerous; tortoises, both terrestrial and aquatic, are abundant; among the fresh-water species, the *Trionyx ferox*, of Georgia and Florida, and the *Matamata*, are remarkable. The green turtle, so prized, abounds in the seas of the warmer latitudes.

Several species of alligator infest the rivers of South America; large lizards called iguanas, and esteemed as food, inhabit the woods; huge boas lurk in the dense forest, or on the morasses; and of venomous serpents the rattlesnake and the lance-headed viper are well known.

Various species of Amphibia, as frogs and toads, are peculiar to America; of these we may mention the elegant tree frogs (*Hyla*), and the loud-voiced bull-frog (*Rana mugiens*). Those singular amphibia, the axolotl (*Menobranchus piscifórmis*), the siren (*Siren lacertina*), the gigantic salamander (*Menopoma Alleganiensis*), the amphiuma, are all American; as is one species of that strange form, half fish half reptile, the *Lepidosiren* (*L. paradoxa*); it is a native of the Amazon; the other species is an inhabitant of the Gambia, Western Africa.

Of the Ichthyology of America we shall say nothing. Many of the forms and species of Europe are found in the seas and fresh waters of America.

The Entomology of America cannot here be discussed. The size and beauty of the butterflies of the warmer regions, the ravages of armies of ants, the domes of the termites, and the brilliancy of the fire-flies, as they flit like showers of stars athwart the woodland glades during the gloom of night, have all attracted the notice of travellers. In many districts musquitoes are a severe scourge; the chigo is a dreaded pest; scorpions and huge centipedes of various species abound in the hotter latitudes.

Botany.—The climate and soil of this extensive continent are so varied by its extensive mountain-ranges, rivers, and forests, and by its diversified geographical position, that it would be in vain to attempt an account of its vegetable productions in any other way than by following them in their changes from the stunted flora of the north to the splendid scenery of the equatorial regions, and thence southwards as diminished temperature and its attendant circumstances again successively reduce the plants to a condition at the southern extremity in many respects analogous to that of the arctic circle.

If we contemplate the surface of this part of the world with reference to those circumstances which produce the greatest effect upon vegetation, by the diversity of climate that they occasion, we shall find that its mountain-ranges divide it into two portions of nearly equal length but very unequal breadth, the eastern being many times wider than the western, which is comparatively little more than a line of coast.

The vegetable productions of the two sides of this dividing line are so exceedingly different, that it will be indispensable to notice them separately.

The most northern station in which vegetation has been discovered, is Melville Island, 74° 50′ N. lat. Of this desolate region a very accurate account has been drawn up from the materials collected by the officers attending Captain Parry; and notwithstanding the very low temperature even in summer, a considerable number of species are able to maintain an existence. These, however, are all of a very humble growth; not a tree or even a bush is able to rear its head, nor, indeed, is there a single plant of woody structure, except a little willow, which rises six inches high. It is in these latitudes that the red snow plant (*Protococcus nivalis*), exists in all its beauty. In this part of the flora a decided similarity exists to the plants of the same latitudes in Europe and Asia.

In the United States the great features of the North American flora are at length assumed. The forests consist of pines and larches unknown in Europe, of many kinds of oaks, of locust-trees, black walnuts of enormous size, hickories, and ashes; among which the noble tulip-tree rears its towering head: in the swamps grow the deciduous cypress, the white cedar, certain fir trees, the rhododendron, the glaucous kalmia, &c.; the sides of the mountains and hills are covered with the American arbor vitæ, the sorrel, and the beautiful mountain laurel; and, finally, the undergrowth of the woods and plains contains endless species of aster, and various species of the exclusively American genera, liatris, phlox, gerardia, calycanthus, &c. Tobacco, maize, and wheat, are the staple objects of cultivation.

The approach to a tropical climate is first indicated by fields of cotton and rice, which on the Atlantic side commence at no point that can be definitely fixed, but generally may be said to begin south of Virginia.

In southern Mexico we enter the tropics; and in all the valleys and plains where the temperature is not lowered by interrupting causes, the usual vegetation of such latitudes occurs. Besides these and the other common articles of cultivation by the inhabitants of the tropics, such as indigo, coffee, sugar-cane and maize, which here

finds its native home, the cocoa tree, from whose seeds chocolate is prepared, is a most important species; the exportation of the seeds of this plant, which is found wild in the most burning districts, is valued at near 80,000*l.* sterling annually. Pine-apples grow wild in the woods; the American aloe yields, when wounded, an abundance of sweet fluid, which is fermented into an intoxicating drink called *pulque*, and distilled into an ardent spirit known by the name of Vino Mercal. In the low woods of Honduras are found enormous forests of mahogany and logwood trees. It is here also that the tamarind and the lignum vitæ are found, the vanilla, and the jalap convolvulus.

But in the highlands of Mexico all this glorious vegetation disappears; the eatable-rooted nasturtium and the tuberous wood-sorrel supply the place of the yam: mahogany-trees give way to oaks, and to the singular hand tree, the five united stamens of whose flowers are disposed like the talons of a bird of prey. In the lower parts of these highlands the vegetation of course approaches nearer to that of the plains.

In many respects the West Indies resemble the tropical parts of Mexico; the plants are either naturally the same, or have become so by importation from one shore to the other.

In all the remainder of eastern tropical America similar characters of vegetation are found. But the genera and species gradually change as we recede southward from the line. In those provinces to the north of the line, the land beyond the limits of cultivation contains some extensive forests. It is here, however, that the quassia bitter, the fragrant tonga bean, which is so much employed for perfuming snuff, and the rose-wood, are produced. Cannon-ball trees drop their monstrous fruits in these forests; and arborescent species of the cinchona tribe, &c., furnish medicinal barks scarcely inferior to that of Peru.

In Brazil the country is more open, and the scenery more diversified; besides which, it may be easily conceived that many most striking changes would occur in twenty-three degrees of latitude. The whole face of Brazil may be said to be divided into forests, deciduous stunted woods, and immense plains, to each of which a peculiar vegetation appertains.

To the southward, vegetation becomes less and less tropical, never, however, assuming a European aspect, till at last in Patagonia and the adjacent islands, an antarctic imitation of northern vegetation makes its appearance. Beech trees of new species, singular parasitical plants, Winter's bark, stunted berberries, evergreen arbutus, with a trailing habit; and the traveller occasionally is astonished at seeing arborescent fuchsias in flower, with humming-birds flitting among their branches in the midst of a snow-storm.

The western coast is far different, latitude for latitude, from the eastern: chilled by the unmitigated cold blasts from the south pole, destitute of large rivers and of all means of irrigation for a very considerable extent, it is a mere succession of fertile valleys and desert hilly plains. To the south, the sides of the mountains are covered with the Araucaria pine. Numerous bushes of compositæ give an arid but glittering aspect to other parts; and in the spring, at the time of the melting of the snows, the sides of the mountains are enamelled with the beautiful flowers of the pica di loro, leucocoryne, and other herbs.

Political Divisions.—All the chief divisions of America are described under their respective heads. The most northern consist principally of the north-western coast discovered by the Russians, and called Russian America; the Arctic Countries between Mackenzie River and Baffin's Bay; Labrador, between Hudson's Bay and the Atlantic; and Greenland, eastward of Baffin's Bay.

The provinces immediately under the British government in North America are bounded on the north by the territory of the Hudson's Bay Company, and on the south by the United States. They comprise the provinces of Upper and Lower Canada, New Brunswick, Nova Scotia, Cape Breton, Prince Edward's Island, Newfoundland, Labrador, the Island of Anticosti, and, under recent arrangements, a part of the Oregon Territory.

The territory of the United States of America extends from the British possessions to the Gulf of Mexico, and from the Atlantic to the Pacific Ocean. It consists of many separate states in a federal union.

The present republic of Mexico, extending from 16° N. lat. to 42° N. lat., comprises about 1,639,000 sq. miles, and perhaps about 8,000,000 of inhabitants. It was formerly under the dominion of Spain, and comprehended the two Californias, three provinces, and twelve intendencies. The present political divisions are different. [Mexico.] Texas has been recently severed from Mexico, and annexed to the United States.

The republic of Guatemala, or Central America, formerly Spanish, adjoins Mexico on the south, and comprises 206,000 square miles. It consists of five states.

South America comprises the following states:—

The most northern part, lately Colombia, is now divided into the three republics of New Granada, Venezuela, and Ecuador. To the south of these extends, along the western coast, the republic of Peru, formerly Spanish. The republic of Bolivia, formerly Spanish, lies to the south of Peru; and still further south is the republic of Chili.

The United Provinces of La Plata lie between the two last-mentioned states and the Atlantic Ocean. The empire of Brazil, formerly a Portuguese possession, is the principal South American state washed by the Atlantic. It bounds on the east the small state of Paraguay. The republic of Banda Oriental, or Republica Oriental de l'Uruguay, lies immediately to the south of Brazil. Paraguay and the Tierra del Fuego terminate the continent on the south.

Guayana is a tract of country on the north-eastern coast, to the north of the river Amazon. It comprehends the British possessions of Demerara, Essequibo, and Berbice, the French possession of Cayenne, and the Dutch colony of Surinam.

The islands often called the West Indies, in the Columbian Archipelago, situated in the Gulf between the two continents, are also included in America. They consist of the Bahama Islands, the Great Antilles, viz. Cuba, Jamaica, St. Domingo or Haiti, and Porto Rico; the Smaller Antilles, viz. Barbuda, Antigua, Guadaloupe, Dominica, Martinique, St. Lucie, Barbadoes, Granada, Tobago, St. Christopher's, St. Vincent's, and Trinidad; besides a number of smaller islands.

AMERICA, BRITISH. [BRITISH AMERICA; CANADA; HUDSON'S BAY; OREGON.]

AMERICA, CENTRAL. [CENTRAL AMERICA.]

AMERICA, NORTH-WESTERN. [NORTH-WESTERN TERRITORY.]

AMERICAN ANTIQUITIES. The interesting monuments of former days, discovered within the last few years in America, are noticed under MEXICO; OHIO; PERU; YUCATAN.

AMERICAN INDIANS. [NORTH-AMERICAN INDIANS.]

AMERICANISM, a term used to express some peculiarity in the written or spoken language of the inhabitants of the United States of North America. Of all the colonies of Great Britain, in which her language has been planted, the United States are yet the only parts that have been separated from the mother-country, and have attained political independence. In consequence of the rapid increase of their population, the diffusion of education, and the springing up of a numerous body of native writers, we see a new phenomenon in the history of the world—two great independent political bodies, separated by a wide ocean, using the same language, having a similar political system, and a system of law in many respects the same. To preserve this language in its purity, as far as its essential character is concerned,—to introduce no new words but such as experience shows to be necessary,—to form them on true principles of analogy, and to give to them precise and definite meanings;—these are objects of equal importance to the two nations; for the preservation of a common language is a bond of unity and one of the great elements of civilization. The mother-country may yet claim the privilege of a very rigid examination of American importations, before she allows them to be current coin of the realm; but to attempt to reject all new words that America produces would be both absurd and ineffectual. New wants and new circumstances are the parents of new terms, which perhaps increase quicker in America than in an old country. The main differences between the spoken and written English language as it exists in America and Great Britain appear to be the following:—pronunciation; the use of words now obsolete in England, or used here in a different sense; the use of words in various parts of America as they are still used in various provinces of England; and some new words.

In pronunciation, there is much greater uniformity in the United States than in Great Britain, and in many parts of America the pronunciation is at least as good as in any part of the British dominions. But still there are differences very perceptible when we compare the natives of two remote parts of the United States; and if we take into account the wide spreading of the American nation, the great influx of foreigners, the absence of good education in some newly-settled parts, and the want of a metropolis to fix a standard of pronunciation, it is probable that the pronunciation may in time differ widely in different parts. The rapid communication from one part to another will help somewhat to check this tendency.

As to the use of words now obsolete in England, they are mainly confined to conversation.

The number of words now used in a different sense from that which they have in England is but small among writers of good authority; the list of those used in conversation would be somewhat larger. The word *mutton* is used in some parts as it once was in England, to signify a sheep. Dr. Webster remarks, that this sense is obsolete or ludicrous: it is not either obsolete or ludicrous in the spoken language of some districts. The word *bug* is used (see Webster) in its original sense of a *fly;* and the old verb *prógress*, which the Americans use very often and pronounce *progrĕss*, is now beginning to be again adopted in its native country, though we think we could very well do without it. For other like instances, the reader may refer to the following words in Webster: to *wagon* (*waggon*); *stud-horse; subserve; clever* (Webster's account of the English use of this word is incomplete); *notify, graduated*, &c. The American uses of *creek, girdle, section*, &c. may be seen in Webster. *Fivebar*, in Webster, for five-barred, is a mere vulgarism. Mr. Pickering, in a work published at Boston in 1816, has traced a great number of words and phrases which have been considered as Americanisms to the counties of the mother-country.

The number of new words used in the written language is not great. The word *bindery*, meaning 'a place where books are bound,' is in Webster. Perhaps it is a new, but it certainly is not a bad word. In American advertisements we observe the word *book* is generally prefixed; thus we might say, a *book-bindery*. *Sparse* is, for any thing we know, a new word, and well applied; the Americans say a *sparse* instead of a *scattered* population; the term has a more precise meaning than scattered, and is the proper correlative of *dense*.

Many words of a moral import are beginning to vary considerably as to the signification attached to them in England and America.

The orthography of the English language is liable to more change in America than in England: the Americans, as a general rule, do not observe orthography so strictly as the English, of which any reader of American papers may convince himself.

We have said nothing of *style*, or the character of American writing as distinguished from English, as this lies beyond the proper subject of the article. The main difference appears to us to consist in the superior value attached in America to oratorical display, and in the common opinion of what constitutes fine writing and eloquence.

AMERIGO VESPUCCIO. [VESPUCCIO.]

AMERKOTE, or OMERCOTE, a town of Sinde, in 25° 18′ N. lat., 69° 48′ E. long [SINDE.]

AMERSFOORT, a town in the province of Utrecht, 30 miles E.S.E. of Amsterdam, on the small navigable river Eem, which runs into the Zuider Zee; population in 1841, 9000. There are manufactures of bombazeen, fustian, glass, and tobacco: a great deal of tobacco is grown and dried in the neighbourhood.

AMERSHAM. [BUCKINGHAMSHIRE.]

AMES, JOSEPH, the author of a history of printing in England, under the title of 'Typographical Antiquities.' This work serves as the basis of the only elaborate history we have of English printing. It has probably preserved a good many title-pages, and other facts connected with its subject, that would have been lost had the recording of them been longer deferred; and it is, upon the whole, creditable to the industry of its compiler. The most valuable part of the book has been added to it by its subsequent editors, and especially by Mr. Herbert. Ames had the merit of acquiring a considerable fund of knowledge by his own unassisted perseverance. He attained a competence by trade, and then devoted himself to his favourite studies. He was born in 1689, and died in 1759.

AMESBURY. [WILTSHIRE.]

AMETHYST. The *Occidental* or *Common Amethyst* is a variety of quartz or rock crystal, which is met with in many parts of the world, as India, Siberia, Sweden, Germany, Spain, &c. It occurs in various forms, massive, in rounded pieces, and crystallized. The primary form of the crystal is a slightly obtuse rhomboid; but it is usually found in the secondary form of a six-sided prism, terminated at one or both ends by a six-sided pyramid. The crystals of the amethyst vary from diaphanous to translucent, and they exhibit various degrees of splendour, both externally and internally. The fracture is commonly conchoidal, and the fragments are of indeterminate form. The colour is violet or purple violet. The amethyst is sufficiently hard to give fire with steel, and to scratch glass.

For *Oriental Amethyst*, see CORUNDUM.

AMHARA. [ABYSSINIA.]

AMHA'RIC LANGUAGE has its name from Amhara, in Abyssinia, where it is or was spoken in its greatest purity. Inferior dialects of the Amharic are spoken in the provinces of Gojam, Angot, Efat, Shoa, Bagemder, Samen, &c. The Amharic is supposed to be meant by Agatharchides, when he speaks of a language called Kámara. (Hudson, 'Geogr. Min.' t. i. p. 46.) The Amharic began to prevail in Abyssinia over the Geez language, when Icon-Amlak, about the year 1300, having overcome the Zagæan dynasty, ascended the throne of his ancestors, and removed the residence of the royal court from Axum to Shoa, where he had lived in exile. A knowledge of the Amharic enables a traveller to make himself understood in nearly every part of Abyssinia, although there are numerous dialects, of which no complete classification has yet been accomplished; of these the Tigré resembles much more the ancient ecclesiastical Ethiopic or the Geez language, than the Amharic. The Arabian writer, Makrizi, counts fifty dialects. It will be probably quite as difficult to define the exact number of Ethiopian, as of Arabic, modern Greek, and English dialects, or the number of languages in general. The king of Abyssinia, his councillors, ecclesiastics, monks, and every well-educated Abyssinian, know the Geez language, in which documents and letters are usually composed. Therefore the *Geez* is called *lesana matzhaf*, or *metzhafeña*, that is, the language of letters or books.

The British and Foreign Bible Society have published a 'Psalterium Davidis Amharice,' London, 1833, large 18mo., and 'Novum Testamentum in Linguam Amharicam vertit Abu Rumi Habessinus, edidit Thomas Pell Platt,' London, 1829, foolscap 4to. The whole Bible has since been printed, under the superintendence of Mr. T. P. Platt, late Fellow of Trin. Coll., Cambridge. The New Testament and the Psalms have been circulated by Mr. Gobat and other missionaries in Abyssinia, and have been sometimes transcribed by the natives who could not be provided with printed copies. The French consul at Cairo, Asselin de Cherville, caused Abu Rumi, an old Abyssinian, who had been the instructor of Bruce and Sir William Jones, to translate the whole Bible into Amharic. This is the translation which is in the possession of the British and Foreign Bible Society.

The Amharic adds to the twenty-six characters of the Geez seven others, which are mere modifications in order to express some characteristic sounds. The vowels are expressed by variations in the shape of the letters, so that each character or letter is in fact a syllable, being a consonant followed by a vowel, thus: *lă, lé, lí, lá, lú, lĕ, lo.* The Amharic, with other Ethiopic dialects, is written from the left to the right hand, like our western languages. [ETHIOPIAN LANGUAGES.]

AMHERST, a town on the eastern side of the Bay of Bengal, in 16° 5′ N. lat., 97° 25′ E. long., stands on the south bank of the estuary of the Saluen or Thaleain River, which here falls into the Gulf of Martaban. This town was built by the British, in 1826, on the termination of the Birmese war, in order to supply the place, as a military post, of the town of Martaban, which was restored to the Birmese under the provisions of the treaty. The place was named in honour of the then Governor-General of India. The situation of Amherst appears to be well chosen for the purposes of commerce, it being easy of access to the Birmese, the Chinese, and the people of other countries beyond the Ganges. The run by sea between this place and Rangoon is short, and suited to the small vessels employed by the Birmese in their coasting trade.

Amherst is a bar harbour, with rather a dangerous entrance; but when this is passed, the anchorage is good in five fathoms water, within 100 yards of the shore. The bar has only one fathom at low water. The tide flows about six miles an hour, and its greatest rise is nineteen feet. For two hours before high water, and the same time after, the harbour is so

still, that the communication with the shore is perfectly easy. The population, which in the beginning of 1827 was 1600, is now stated to be above 16,000.

AMHERST. [MASSACHUSETTS.]

AMHERST, JEFFERY, BARON, was the son of Jeffrey Amherst, Esq., of Riverhead, in Kent, and was born on the 29th of January, 1717. He received an ensign's commission in 1731, and was present at the battles of Dettingen and Fontenoy, and afterwards at the battles of Laffeld and Hastenbeck as aide-de-camp to General Ligonier and the Duke of Cumberland. In 1756, while still abroad, he received the colonelcy of the fifteenth regiment of foot. Two years after he was sent to America as major-general of the troops destined for the siege of Louisburg in Cape Breton. After the reduction of Canada in 1760, to which he had materially contributed, he received the thanks of the House of Commons and was made a Knight of the Bath. Soon after he was appointed commander-in-chief of all the forces in America. On the peace in 1763 he was appointed governor of Virginia. In 1770 he was made governor of Guernsey, and two years after lieutenant-general of the ordnance and commander-in-chief of the forces in England. In 1776 he was created Baron Amherst of Holmesdale, in the county of Kent. He retained his appointment of commander-in-chief till the breaking up of the administration of Lord North, in 1782, when, on his resigning it, the king gave him the office of gold stick in waiting. In 1788 he received a second patent of nobility with the title of Baron Amherst of Montreal in Canada, with remainder to his nephew. On the 22nd of January, 1793, he was again appointed to the command of the army, which he held till the 10th of February, 1795, when he was succeeded by the Duke of York. Lord Amherst died at his seat at Montreal, near Sevenoaks, Kent, on the 3rd of August, 1797, in the eighty-first year of his age. He had been twice married but left no children, and was succeeded in his title and estates by his nephew, William Pitt, now Earl Amherst. (*Gentleman's Magazine* for 1797.)

AMHERSTBURGH, a town in the western district of Upper Canada, in 42° 5′ N. lat., and 83° 10′ W. long., in the township of Malden, Essex county. It stands on the northern shore of Lake Erie, near the mouth of the river Detroit, and on its eastern side. Being a frontier town it has some military defences, and contains a garrison. There is a very safe and commodious harbour, with a good anchorage, in three and a half fathoms water. The surrounding country is highly fertile, and the climate good. Apples, pears, peaches, plums, nectarines, and grapes, are produced in great perfection and abundance. The lake and river furnish a plentiful supply of excellent fish, and the woods contain abundance of game. (Bouchette's *Account of the British Dominions in North America.*)

AMIANTHUS. [ASBESTES.]

AMIDES, AMIDOGEN. [AMMONIUM.]

AMIDINE, a peculiar substance, procured from wheat and potato starch by the application of heat. It is opaque or semi-transparent, white or yellowish-white, inodorous, insipid, very friable, soluble in any proportion in water of 140° Fahr., but insoluble in alcohol. It resembles starch in giving a blue colour with iodine and in other properties, but differs from it in being soluble in cold water, and in not gelatinizing with boiling water, even when it forms one-fifth of the solution.

AMIENS, an ancient town of France, in the department of Somme, 75 miles N. of Paris, in 49° 53′ N. lat., 2° 18′ E. long. It is a town of Celtic origin, and existed at the time of Cæsar's invasion of Gaul, under the name of Samaro-Briva, which denotes a bridge over the Samara, now the Somme. At a later period it acquired the name of the tribe of which it was the chief town, the Ambiani; this name, under a modified form, it still retains.

Amiens was the capital of the former province of Picardy; it is now the capital of the department of Somme. It is the seat of a cour royale, of a tribunal of commerce, and of a bishop, whose see includes the departments of Somme and Oise. The town is well-built, with broad straight streets. The river Somme, which traverses it in three branches, is navigable for small craft. There is a citadel, but the ramparts of the town have been demolished, and serve now as promenades. The chief buildings are—the town-house built by Henry IV., in which is a collection of paintings of the French school, the corn-market, the college, and the cathedral, one of the finest specimens of Gothic architecture in Europe. The nave of this edifice, the loftiest in France, is regarded as a master-piece; and the lightness of the pillars attracts much admiration. There is also a university academy, which includes in its jurisdiction 10 communal colleges, 50 boarding-schools, and 2697 day-schools, which are spread over the departments of Aisne, Oise, and Somme; there are besides a royal college, a school of medicine, a public library of 40,000 volumes, a botanic garden, and several literary and scientific societies. There are two fine promenades in the town.

The trade of Amiens is considerable. Velvet, plush, camblet, quilting, serge, drugget, fine kerseymere, hosiery, and other goods, linen, cotton, and woollen, are either entirely manufactured, or, being brought to Amiens from other places in an unfinished state, are prepared for sale in other parts of the country or for exportation. There are also paper-mills and bleaching-grounds. The town serves as a mart for the numerous manufactures of the neighbourhood as far as the confines of the department. The total value of the commercial industry of the district, of which Amiens is the centre, was estimated in 1843 at 40,000,000 francs. The value of raw silk, wool, and cotton used in manufactures is set down at between 5 and 6 millions of francs, while the value of the products is stated to be between 15 and 16 millions of francs. The population of the town in 1843 was 47,100; that of the arrondissement in 1841 was 184,166. The railroad between Amiens and Abbeville was opened on the 15th of March, 1847; it is 31 miles in length,

and forms part of the line which is to run from Paris to Boulogne, through Amiens.

(Balbi, *Géographie; Annuaire*, 1846; *Journal des Chemins de Fer*, Feb. 6, 1847.)

AMIENS, TREATY OF, the treaty of peace between Great Britain on the one part, and France, Spain, and Holland on the other, signed at Amiens on the 25th of March, 1802. The preliminaries of this peace had been signed at London on the 1st of October, 1801; and on that occasion, it was agreed that the terms of the final treaty should be settled at Amiens. The Marquis Cornwallis was the plenipotentiary for England, Roger Jean Schimmelpenninck for Holland, Don Joseph Nicholas D'Azara for Spain, and Joseph Bonaparte for France.

The treaty of Amiens consisted of twenty-three articles, including the supplementary one. France agreed to evacuate Naples, and the States of the Church; England, on her part, gave up all her conquests during the war, to the powers to whom they had formerly belonged, with the exception of Trinidad which had been taken from Spain, and the part of Ceylon which had been possessed by the Dutch. Egypt was restored to Turkey. It was also stipulated, that within three months after the exchange of the ratifications of peace, the English troops should evacuate the islands of Malta, Gozo, and Comino, which should be given back into the possession of the Knights of St. John of Jerusalem, to be held by them on conditions which were enumerated under thirteen heads. It was this last stipulation which afterwards afforded the ostensible ground for the breach between the two principal powers which had been parties to the treaty of Amiens. Hostilities were renewed between France and England by a declaration of war on the part of the latter, on the 17th of May, 1803.

AMIGO'NI, JA'COPO, born at Venice in 1675, was a painter of portraits in oil and frescoes. He lived ten years in England, during which time he saved 5,000*l*. He also painted small conversation pieces.

Amigoni's frescoes are purely ornamental, mere variegated decorations. He died at Madrid in 1752.

AMILCAR. [HAMILCAR.]

AMIOT, LE PERE, a learned French Jesuit, and a missionary to China. He was born at Toulon in 1718. Having entered the order of the Jesuits, he distinguished himself as much by his natural talents as by his persevering application to study. Being sent by his superiors to the eastern missions, he arrived at Macao in 1750, whence he proceeded the following year to Pekin. Father Amiot soon won the friendship of the Emperor of China, and he continued ever after to reside at Pekin, for the space of forty-four years, till his death in 1794. To his knowledge of the Chinese he added that of the Mantchu language, which he studied at Pekin, under a military officer of that nation, and which, as he modestly observes, he found very useful for interpreting many obscure passages in the Chinese writers. Amiot continued to send successively from Pekin to Europe the fruits of his assiduous researches in the literature of the country he had adopted; and imparted more information on China and Chinese literature than any of the missionaries who had preceded him. At the same time he had the spiritual direction of the congregation of native Christians in the capital.

AMLWCH, a town in the island of Anglesey, which contained, in 1841, a population of 1243; the population of the borough and parish was 6217. Amlwch is included in the Beaumaris district of boroughs, which returns one member to Parliament. It has a capacious harbour, cut out of solid slate rock, and capable of accommodating thirty vessels of 200 tons burden.

Amlwch was an insignificant village till 1768, about which time the celebrated and highly productive *Parys* copper mines, in the neighbouring mountains, were discovered by the united exertions of Sir Nicholas Bayley and Messrs. Roe. Soon afterwards the *Mona* mine was discovered, in the same mountains; and both have since proved highly profitable to the Marquis of Anglesea and other proprietors, and also to the town of Amlwch. At one time, in the history of these mines, the copper ore was found in large conglomerate masses, which admitted of being quarried in open day; at another, it occurred in regular veins or lodes; and as the excavations advanced, the metal was found more and more mixed with earthy matters; so that, at the present time, the ore (chiefly sulphuret of copper) does not contain more than 4 per cent. of metal, and the produce is far less remunerative than formerly. At one time the mines gave employment to 1500 men; the stock of ore on hand often exceeded 40,000 tons, and the works for smelting the ore were of great magnitude. [COPPER.]

A'MMAN, JOST, engraver and designer, born at Zürich in 1539. He established himself in Nürnberg in 1560. As is the case with most of the old German masters, little or nothing is known about Amman's life; many writers speak of him as a painter, yet there is not a single painting of his known. Amman's designs are extremely numerous. There are about a thousand woodcuts attributed to him, but whether he cut all or even any of them himself is not known. Bartsch also doubts whether all the etchings attributed to Amman are etched by him; he supposes some to have been etched by Stephen Herman. His designs generally appeared as the illustrations of books; few books were published in Amman's time without illustrations. Siegmund Feyerabend of Frankfurt was the publisher of most of Amman's works; many of them were published after his death. He died at Nürnberg in 1591. His works comprise nearly every subject—history, sacred and profane, general costume, military costume, field-sports, natural history, heraldry. His drawing is generally good, and in the costume very accurate and evidently drawn from nature; his animals also are executed with much spirit.

AMMANA'TI, BARTOLOME'O, sculptor and architect, was born at Florence in 1511, and bred in the very height of the golden age of Italian art. Baccio Bandinelli and Sansovino were his tutors. Ammanati became one of the most

devoted admirers and imitators of Michel Angelo, and, like many other painters and sculptors, catching chiefly the defects of his style, fell into the error of treating the limbs as the most essential part of man. Ammanati was much employed in Rome by several popes,—by Paul III., Julius III., and afterwards by Gregory XIII. During the interval between the two periods that he was employed by these pontiffs, he attained great fame at Florence as an engineer and an architect. He constructed the celebrated Ponte della Trinità, which spans the Arno in three light and elegant elliptical arches, calculated to allow the sudden floods of that river to pass without the slightest risk: it still exists, and has withstood lately (1844) the most impetuous flood that has visited the Arno for centuries, in which even the newly constructed iron suspension-bridge was swept away. His wife was the celebrated Laura Battiferri, of Urbino, distinguished as a poetess. Ammanati survived her three years, and died, according to Baldinucci's copy of the inscription on his monument, in 1592, aged eighty-one.

AMMELIDE, a recently discovered substance obtained from ammeline. It is a white powder, insoluble in water, alcohol, and æther, but soluble by the alkalies and strong acids. It consists of C^{12}, H^9, N^9, O^6.

AMMELINE, a substance obtained by the action of hydrochloric acid on melam. It is of a splendid white colour, and is composed of very fine silky needles; it is insoluble in water, alcohol, and æther, but soluble in the caustic alkalies. When fused with hydrate of potash, ammeline is converted into ammonia and cyanate of potash. It consists of C^6, H^5, N^5, O^2.

AMMIA'NUS MARCELLI'NUS, a soldier and author who lived in the fourth century, and wrote a history, in the Latin language, of the emperors, from the accession of Nerva, A.D. 96, to the death of Valens, in 378. His history commenced where that of Tacitus ended. Ammianus was of Greek family, and probably born at Antioch (Libanius, 'Ep.' 983). At an early age he entered the army, in the service of the household guards of Constantius, son of Constantine. Constantius reigned in conjunction with Constans, from A.D. 340 to 350. Ammianus served under Ursicinus in Gaul, where he probably got that information about the Gauls which is contained in the fifteenth book of his history. He also accompanied Ursicinus in the expedition against the Persians. In the reign of Julian he was engaged in the Persian wars of that emperor. He lived also under the successors of Julian, and survived the accession of Theodosius I., A.D. 379. If the letter of Libanius above referred to is addressed to this Ammianus, he was then living at Rome; and it appears, from passages in his own work, that he had been there. Of the thirty-one books of the History of Ammianus the first thirteen are lost. The fourteenth book begins just before the death of Constantius, and the transactions of the reign of Julian extend nearly to the end of the twenty-fifth. The question whether Ammianus was a Christian or a pagan has been agitated. Though he has not expressly stated his sentiments, the most probable conclusion from his own work is that he was not a Christian. In style he is inflated; but passages of considerable effect and eloquence occur in his work, which has every appearance of being a faithful narration of public transactions, in many of which he had been personally engaged. 'It is not without sincere regret,' says Gibbon, 'that I must now take leave of an accurate and faithful guide, who has composed the history of his own times, without indulging the prejudices and passions which usually affect the mind of a contemporary.' (Chap. xxvi.) The edition of J. Gronovius, Leyden, folio, 1693, contains the prefatory matter of the Valesii. The last edition, with the notes of various critics, is by J. A. Wagner and C. E. A. Erfurdt, Leipzig, 1808, 3 vols. 8vo. There is an English translation by Philemon Holland (fol. Lond. 1609), and French translations by De Marolles, Paris, 1672, and by Moulines, Berlin, 1775, Lyon, 1778.

AMMODYTES, a genus of fishes belonging to the division of *Apodal Malacopterygii* and family *Muræniдæ*. The body is very long and the head lanceolate. On the back is a dorsal fin extending nearly its whole length. The anal fin is also long; and the caudal, which is forked, is separated from both the dorsal and anal. Two species occur on the coasts of the British Islands, the *Ammódytes tobianus* and the *Ammodytes lancea*. The former, termed Sand-Eel, is the larger, and is distinguished by the greater size of the head, and by the dorsal fin, which commences in a line with the extremities of the pectorals, whilst in the *A. lancea* it commences in a line with the middle of the pectorals. Length between 12 and 15 inches. The back is of a dark bluish-green; the sides and belly bright silvery-white. It frequents sandy shores in great numbers, but is capricious in its visits. At the ebbing of the tide it buries itself with great dexterity and rapidity in the wet sands to the depth of from 4 to 6 inches, whence it is extracted by means of various instruments, made for the purpose. It is much esteemed by fishermen as a bait, and is also sought after on many parts of the coast as an article of food.

The Sand-Launce, *Ammodytes lancea*, is a smaller species, and usually of a more brownish hue, with a tinge of red about the head. It is more abundant than the sand-eel, and has always been distinguished from it by the fishermen, though for a long time confounded with it by naturalists. The distinctions between the two species were first pointed out by M. Lesauvage of Caen. Both appear to be generally distributed through Northern and Western Europe. In Scotland the sand-eel is known by the name of the Horner, and in the Isle of Man the two species are distinguished from each other as the Grey Gibbon and Red Gibbon.

(Yarrell, *British Fishes*, vol. ii.; Parnell, *Fishes of the Frith of Forth.*)

AMMON, or AMUN, or AMN RA, the name of an Egyptian deity, whom the Greeks considered as synonymous with their Zeus (Jupiter). He is often represented on the monuments of Egypt, and in other works of Egyptian art, with a ram's head and a human body; about

which Herodotus (ii. 42) tells an odd story. The two chief Ammonian temples which now exist are that at Carnac, on the east side of the Nile, forming part of the extensive ruins of Thebes, and that of Siwah, in the Libyan desert, known to the Greeks by the name of Ammonium.

The god Ammon appears also under the figure of a crio-sphinx, or ram-sphinx, which is an animal with a ram's head and the body of a beast of prey of the feline species. ('Egyptian Antiquities,' in 'Library of Entertaining Knowledge,' vol. i., and the drawings in the 'Description de l'Egypte—Antiquités,' tom. iii. pl. 32.)

The *city* or *portion* of Ammon is mentioned in Jeremiah xlvi. 25; Ezekiel xxx. 15, under the name of Amon-No; and, in Nahum iii. 8, under the name of No-Amon. This city is generally supposed to be the Greek Diόspolis, or 'city of Jupiter,' now forming part of the ruins of Thebes. But the No of Nahum is more probably the Diόspolis of the Delta.

The name Amon forms a part of the proper name of several Egyptian kings and persons.

AMMO'NIA, the modern name of the *volatile alkali*, formerly so called to distinguish it from the more fixed alkalies: it is a gaseous body, and was first procured in that state by Priestley, who termed it alkaline air. He obtained it from sal ammoniac, and hence the present name of the alkali.

Ammonia, like all the other alkalies, is a compound substance; it consists of nitrogen and hydrogen; but these two cannot be made to combine by direct action. When muriate of ammonia is heated with lime, a complicated interchange of elements takes place, whereby the ammonia of the muriate is liberated in the gaseous form. Ammonia is colourless, transparent, and of course invisible; possessing the elasticity and mechanical properties of atmospheric air. The smell is peculiar and extremely pungent, and its taste is highly acrid. An animal put into it is immediately killed, and a taper when immersed in it is extinguished: it appears, however, to be slightly inflammable, for the flame is rather enlarged before it goes out; and a small jet of the gas may be burned in oxygen gas. The density of ammoniacal gas is to that of atmospheric air, nearly as 0·5902 to 1; 100 cubic inches weigh rather more than 18 grains. It acts strongly as an alkali, turning vegetable blues green, and yellows reddish brown, and saturates acids, forming various salts. Water dissolves ammoniacal gas with great rapidity, and in large quantity; at 50° it is capable of condensing 670 times its volume; the density of the solution diminishes as its strength increases, so that, according to Davy, with whom other chemists nearly agree, when water contains 9½ per cent. of ammonia, its density is 0·9692; but when it holds 32½ per cent., it is reduced to 0·8750. The aqueous solution is colourless, transparent, and has the pungency and alkaline property of the gas: by exposure to the air, the ammonia escapes, and by the application of heat it is expelled from the water.

When moderately heated, ammonia expands; but by a strong heat it is decomposed, as it is likewise by the electric spark. When decomposed in this way, it is found to consist of three volumes of hydrogen and one of nitrogen, condensed into one volume; or, estimated by weight,

3 atoms of Hydrogen	= 3	17.64
1 atom of Nitrogen	= 14	82.36
Equivalent	17	100

Ammonia is produced in many different ways, both natural and artificial. Almost every animal substance contains the elements of ammonia, and when such a substance is exposed to decomposition, oxygen and carbon combine to form carbonic acid, while hydrogen and nitrogen form ammonia; and the two together form carbonate of ammonia. If such substances as bones, hoofs, or horns, are heated in iron cylinders, ammonia is separated in combination with many other matters, and after purifying, a liquid called *spirit of hartshorn* results. Vegetable matter containing gluten, coal-soot, and coal itself, may also be made to yield ammonia. Ammonia is produced in small quantities by many difficult chemical processes, but those mentioned above are the chief sources.

Ammoniacal gas may be burned in oxygen gas; a mixture of these gases may also be fired by the electric spark, the results being water and nitrogen; a little nitric acid is also generated, if the quantity of oxygen gas be sufficient to combine with all the hydrogen of the ammonia. Chlorine gas, by mere admixture with ammonia, decomposes it partially, and the action is attended with the evolution of light and heat: the chlorine combines with a portion of the hydrogen of the ammonia; muriatic acid is thus formed, which uniting with the ammonia remaining undecomposed, the result is muriate of ammonia, while nitrogen is liberated.

Charcoal is capable of absorbing ammonia, under peculiar treatment; sulphur decomposes it at a strong heat; and phosphorus absorbs it or decomposes it according to the temperature. With iodine it forms iodide of ammonia, and subsequently iodide of nitrogen. By the heat of a spirit lamp, ammonia forms with sodium or potassium a yellowish crust of those metals, though the surfaces remain brilliant and smooth. When passed over melted iron or copper, ammonia is absorbed; and by voltaic action ammonia may be made to combine with mercury, producing an amalgam which is soft at 70° or 80° Fahrenheit, but a firm crystalline body at 32°. Ammonia combines with many of the metals to form *ammoniurets*, which are described under the names of the metals themselves. In many of its practical applications, ammonia is used in solution in water, called *liquid ammonia*, as being more convenient than in the gaseous form.

Ammonia has within the last few years been made the subject of much inquiry in theoretical chemistry. Liebig has advanced the opinions, that nearly all the nitrogen of plants, and nearly all nitric and nitrate compounds, are referrible primarily to a minute quantity of ammonia existing in the atmosphere; and these opinions are now being closely examined by other chemists, to test their validity.

Acetate of Ammonia.—This is prepared by adding sesquicarbonate of ammonia to dilute acetic acid. It is in the form of transparent prismatic crystals; very deliquescent, and of a hot taste. According to Dr. Thomson, they consist of one atom of acetic acid 51, one of ammonia 17, and seven of water 63 = 131.

Carbonates of Ammonia.—Of these there are three—the *carbonate, sesquicarbonate,* and *bicarbonate.* The *carbonate,* produced either by the union of the two gases, or by the mutual action of carbonate of potash and muriate of ammonia, is a white salt, pungent to the smell and acrid to the taste; soluble in cold water, and decomposed by hot water; it acts as an alkali on vegetable colours. It consists of one atom of carbonic acid 22, and one of ammonia 17 = 39. The *sesquicarbonate,* usually obtained by the action of carbonate of lime on sulphate of ammonia, is a colourless, translucent, moderately hard salt, with a pungent smell and a sharp penetrating taste. It is soluble in about four times its weight of cold water, and is decomposed by hot water. It acts upon vegetable colours like an alkali. It consists of three atoms of carbonic acid 66, two of ammonia 34, and two of water 18 = 118. The *bicarbonate* may be prepared in a great variety of ways. It resembles the sesquicarbonate in appearance, but differs from it in being devoid of pungency; it is rather hard, soluble in cold water, and decomposed by hot water. It consists of two atoms of carbonic acid 44, one of ammonia 17, and two of water 18 = 79.

Muriate of Ammonia.—This salt has been long known, and extensively used, under the name of *sal ammoniac.* It is made in many different ways, and presents the form of cubic crystals. It has a sharp saline taste, but no smell, and dissolves readily in water; exposure to a dry air produces no change in it; by heat, it volatilizes without decomposition. Lime and the fixed alkalies decompose it, evolving ammoniacal gas; and sulphuric acid expels the muriatic acid gas. It is composed of one atom of muriatic acid 37, and one of ammonia 17 = 54. This salt is much employed in various chemical manufactures. It is generally used for preparing ammoniacal gas and the sesquicarbonate of ammonia.

Nitrate of Ammonia.—This salt, produced by the action of nitric acid on ammonia, is in the form of slender crystals; colourless, inodorous, very sharply saline to the taste, readily soluble in water, and deliquescent in a moist atmosphere. When heated to about 500° Fahr. nitrate of ammonia is decomposed, and is resolved into water and nitrous oxide gas. It is composed of one atom of nitric acid 54, one of ammonia 17, and one of water 9 = 80. It is principally used for preparing nitrous oxide gas.

Oxalate of Ammonia, produced by the action of oxalic acid, is in the form of small prismatic crystals; they are devoid of smell, have a bitter saline taste, and dissolve readily in water. They are composed of one atom of oxalic acid 36, one of ammonia 17, two of water 18 = 71. It is used as a test of the presence of lime, and to precipitate it from solution in chemical analyses.

Sulphate of Ammonia.—This salt, produced by the action of sulphuric acid on ammonia, is in the form of small prismatic crystals, having a saline taste and readily soluble in water. It is composed of one atom of sulphuric acid 40, one of ammonia 17, two of water 18 = 75.

The general properties of the salts of ammonia are as follows:—soluble in water, with few exceptions; decomposed by the fixed alkalies, and alkaline earths, with the evolution of ammonia; decomposed when a magnesian salt and a soluble phosphate are added to them, a crystalline precipitate being formed, which is a double salt, composed of phosphate of ammonia and phosphate of magnesia; decomposed and dissipated by heat, except the acid, like the phosphoric and boracic, be a fixed one, in which case the ammonia is expelled, and the acid remains: a solution of muriate of platina occasions a yellow precipitate in solutions of ammoniacal salts.

Medical Properties.—Ammonia in an undiluted state irritates and inflames the animal tissues. When diluted by passing through air, it is occasionally but rarely applied to the eyes. Fatal inflammation of the windpipe has ensued by merely holding carbonate of ammonia, or a handkerchief dipped in strong aqua ammoniæ, under the nostrils; it is therefore requisite to employ the stomach pump when any is to be introduced into the stomach. Besides its local action, ammonia is itself poisonous: its secondary effect on the nervous system, particularly the spinal column, being sufficient to cause tetanic convulsions. Ammoniacal gas absorbed by water constitutes the *aqua* or *liquor ammoniæ,* which is prepared of two different degrees of strength,—viz. sp. gr. 882 and 960. These, when diluted, are used in various preparations.

Ammonia, when suitably diluted to be taken into the stomach, causes a feeling of warmth, with increased energy of the nervous power. Hence it acts as a prompt and valuable counter-poison to prussic acid, the bites of serpents, and the poison of many diseases, such as cholera asiatica and typhoid fevers, at the commencement of which great depression of the nervous system is observed. In lesser degrees of depression, such as the languor of hysterical females or in atonic gout, ammonia or its carbonates are daily resorted to. It is likewise employed to counteract acidity in the stomach. Carbonate of ammonia furnishes a good emetic in the earliest stage of fever with great depression, and is in smaller doses given freely throughout adynamic fevers, sometimes in the effervescing form, especially when action of the skin is desired: citric acid is employed to cause it to effervesce. Hydrochlorate of ammonia is little employed in this country internally, but is used to form discutient and evaporating lotions in conjunction with vinegar and spirit. Acetate of ammonia forms a most grateful refrigerant at the commencement of slight inflammatory complaints, and if the patient be kept warm, generally induces perspiration.

AMMONIAC, GUM, a concrete juice procured in Persia and other parts of the East, from the *dorema ammoniacum.* The juice exudes from the stalk, and is also obtained from the root. It consists of grains of various sizes, usually called

tears: their colour is whitish, but they become yellow by the action of the air; they are shining, opaque, irregular in shape, and more or less globular; when cold, ammoniac is rather hard and brittle; it softens by the heat of the hand, but does not entirely liquify at a stronger heat. The smell is peculiar and disagreeable, and the taste is nauseous, at first mucilaginous and bitter, and afterwards acrid. Its specific gravity is 1.207. When distilled with water it loses its volatile oil, and becomes inodorous; the distilled water has the odour of the gum, and small drops of limpid colourless oil float on its surface. According to Bucholz, ammoniac consists (in 100 parts) of 72 parts of resin, 22.4 parts of gum, and slight traces of bassorine, water, &c.

Medical Properties.—The officinal form for administering this gum is the *mixture*, in which it is partly dissolved and partly suspended in water. It is a most valuable expectorant. Dilute nitric acid greatly heightens its powers. It is also an ingredient in the compound squill pills. Externally, either softened by vinegar or combined with mercury, it is applied as a plaster to disperse indolent swellings.

AMMONITES, a nation descended, according to Gen. xix. 38, from the incestuous connection of Lot with his younger daughter, about the year 1898 B.C. The name of their progenitor, *Ben Ammi*, means 'son of my kindred,' and the name *Ammon* has nearly the same signification. The Ammonites, or the children of Ammon, are called Ammanitæ by the Septuagint and Josephus. The country which they inhabited was situated between the rivers Arnon and Jabbok, N.N.E. of the Moabites, and east of the tribes of Reuben and Gad. The Israelites were directed on their settlement in Palestine not to distress the children of Ammon, because the Lord had given the land unto the children of Lot for a possession, but several wars arose between the people subsequently, for which we must refer the reader to the Pentateuch and the other books of the Old Testament, and also to Maccabees. In the days of Justin Martyr, the Ammonites were still very numerous; and in the time of Origen, the Ammonites and Edomites went under the general name of Arabians. (Polyb. lib. v.) Their metropolis was Rabbah. The surrounding country was called Arabia Philadelphiensis.

The Ammonites were uncircumcised (Jer. ix. 26), and worshipped Molech or Milcom, and their idolatry was introduced among the Israelites by the Ammonitish wives of Solomon. (1 Kings xi. 7, 33; 2 Kings xxiii. 13.)

Of their kings, we know only Nahash and Hanun, in the time of David, and Baalis, contemporary with Nebuchadnezzar. (Jer. xl.)

AMMONITES, a fossil genus of Cephalopodous Mollusca, allied to the recent genus Nautilus. [Cornu Ammonis; Goniatites; Polythalamacea.] In the opinion of all naturalists this great group of fossils requires to be subdivided. The Goniatites of the Palæozoic rocks have been effectually separated, the Ceratites of the triassic strata may be also withdrawn, but still the number of genuine ammonites which remain is too enormous to be treated except in sections more or less founded on structural affinities. Without discussing what may be the best principles for such a classification, we may refer to that of Von Buch, as most generally accepted by geologists. This is mainly founded on a consideration of the sutures, or sinuous lines at the surface of the shell, formed by the edges of the diaphragmal plates which separate the chambers. He has classed them in twelve groups, and indicated their prevalent geological distribution; but though an admirable sketch, it is still far from perfect.

There are also some valuable remarks on the Ammonites in D'Orbigny's 'Palæontologie Française,' and a very instructive examination of their structure by this writer in the 'Annales des Sciences Naturelles,' (1841), N.S., xvi. p. 113, which also contains Von Buch's papers (1829), xvii. 267; xviii. 417; xxix. 5.

AMMO'NIUM, a name given by Davy, Berzelius, and other chemists, to a supposed metallic base of ammonia, composed of 1 nitrogen and 4 hydrogen; the oxide of which combines with acids in the same way as the oxides of the metals, to form the salts of ammonia. Another hypothetical compound, closely connected with ammonia, has received the name of *amidogen*, and is formed of 1 nitrogen and 2 hydrogen. When ammonia and sulphuric or oxalic acid are treated in a particular way, the ammonia seems to give off one atom of hydrogen, and the acid one atom of oxygen, which together form water, leaving instead of sulphate or oxalate of ammonia, *sulphamide* or *oxamide;* the affix *amide* or *amidide* being used to designate that portion of the compound which is formed by amidogen. Neither ammonium nor amidogen has been actually isolated; but each theory has much evidence in its favour, and both may possibly be found reconcileable with each other.

AMMONIUM. [Siwah.]

A'MNESTY is a word derived from the Greek ἀμνηστία, *amnestia*, which literally signifies nothing more than non-remembrance. The word ἀμνηστία occurs in Plutarch and Herodian.

The notion of an amnesty among the Greeks was a declaration of the person or persons who had newly acquired or recovered the sovereign power in a state, by which they pardoned all persons who composed, supported, or obeyed the government which had been just overthrown. A declaration of this kind may be either absolute and universal, or it may except certain persons specifically named, or certain classes of persons generally described. When Bonaparte returned from Elba in 1815, he published an amnesty, from which he excluded thirteen persons, whom he named in a decree published at Lyon. The act of indemnity, passed upon the restoration of Charles II., by which the persons actually concerned in the execution of his father were excluded from the benefit of the royal and parliamentary pardon, is an instance of an amnesty from which a class of persons were excepted by a general description. Of a like nature was the law passed by the French Chambers in January, 1816, upon the return of Louis XVIII. to the throne of France

after the victory at Waterloo, which offered a complete amnesty to 'all persons who had directly or indirectly taken part in the rebellion and usurpation of Napoleon Bonaparte,' with the exception of certain persons, whose names had been previously mentioned in a royal ordinance as the most active partisans of the usurper.

AMOL, a Persian town in the province of Mazanderan, stands on the river Hernuz, about 12 miles from the southern shore of the Caspian Sea, in 36° 30′ N. lat., 52° 23′ E. long. There is a bridge of twelve arches, and eight feet in width, over the river, the stream of which is full and rapid. Amol is divided into eight districts, and in the winter, when it is fullest, may contain 40,000 inhabitants. The bazaars are large and well supplied; but the only traffic carried on is with the country and villages in the immediate vicinity. Amol is the capital of a government of the same name, which yields a revenue of between 7000*l.* and 8000*l.* sterling. The mountains approach close to the town on the south; the space between it and the sea is thickly covered with wood; there are many groups of houses among the trees, but no regular roads.

AMO'MUM, a genus of plants bearing aromatic seeds. The cardamoms, grains of paradise, and mellagetta pepper of the shops, a class of highly aromatic pungent seeds, are produced by different species of amomum. In Sierra Leone there is among other species one, the seeds of which have a stimulant flavour resembling that of camphor.

The genuine officinal or Malabar cardamoms are procured from the *Elettaria Cardamomum*. It occurs in the mountainous parts of Malabar, and is also cultivated. The cardamoms of the Wynaad, which are the most esteemed, and bring the highest price, are cultivated. The fruit is the part collected, but the seed alone is used. The fixed oil somewhat resembles castor oil. The excellence of the specimen depends on the volatile oil.

Ceylon cardamoms are produced in that island. The name of 'grains of paradise' is sometimes given to this plant. It strictly belongs to an African plant, *Amomum Grana-Paradisi*. Grains of paradise are used to sharpen vinegar, beer, liquors, &c., and brewers who have them in their possession are liable to heavy penalties.

Cardamoms are in great favour in the east as a spice, and also as an aromatic stimulant in the treatment of disease. In Europe they are as highly esteemed as carminative and stomachic agents. Dr. Christison observes, that they form part of eighteen officinal preparations, besides their own tinctures.

AMONTONS, GUILLAUME, a diligent mechanician and experimenter in natural philosophy, was born at Paris, in August, 1663. He was during all his life afflicted with deafness, in consequence of a fever in his childhood; and, after a sickness which lasted but a few days, he died in October, 1705. He found the instruments employed for measuring the density, temperature, and humidity of the atmosphere were in an imperfect state; and several years of the life of Amontons were spent in improving them, or in devising others. But the most remarkable circumstance in the life of Amontons is his invention of what must be considered as a species of telegraph. His proposal was to have signal-posts established at intervals between the two extreme stations, which were to be Paris and Rome: a man at each post, being provided with a telescope, was to observe the signal (a letter of the alphabet) made at one station, and to repeat it to the next; the process being carried on thus along the whole line. Two experiments are said to have been made by him in 1702, in presence of the royal family of France. Dr. Hooke had, however, anticipated the discovery about eighteen years.

AMORITES, the most powerful tribe of the Canaanites, or the aborigines of Palestine. The name Amorites seems sometimes to be used for all the Canaanites, who were the descendants of Ham, through Canaan, Sidon, and Heth. (Gen. x. 15—20.) The Amorites are mentioned among the ten nations whose country was given to the seed of Abraham. (Gen. xv. 19—21.) The Amorites dwelt chiefly in the mountains, which afterwards belonged to the tribe of Judah. (Numb. xiii. 29; Deut. i. 20.) Some Amorites dwelt in the plains bordering upon the tribe of Dan, and others between the rivers Jordan and Arnon. The river Arnon was the border between Moab and the Amorites. (Numb. xxi. 13.) Of the cities of the Amorites it was said to the people of Israel, 'thou shalt save alive nothing that breatheth: but thou shalt utterly destroy the Hittites, *Amorites*, Canaanites, Perizzites, Hivites, and Jebusites, as the Lord thy God has commanded thee, that they teach you not to do after all their abominations, which they have done unto their gods.' (Deut. xx. 16.) 'Even their sons and their daughters have they burnt in the fire to their gods.' (Deut. xii. 31.) 'Whoever of the children of Israel or of the strangers that sojourn in Israel, giveth of his seed unto Moloch shall be put to death.' (Lev. xx. 2.) But though often suffering severe losses they were not extirpated, but remained in the mountains in considerable force, for in 1425 B.C. they forced the tribe of Dan into the mountains (Judges, i. 34—36); and even in the time of the Maccabees they formed a distinct tribe (Josephus, 'Antiq. of the Jews,' xiii. chap. 1).

The Amorites were of tall stature. According to Amos (ii. 9), they were high as cedars and strong as oaks. The Amoritish king, Og of Bashan, is recorded as a giant, whose bedstead was nine cubits by four. The rabbins have some wild legends respecting him. The inhabitants of Gideon (Joshua, ix.) were Amorites. (Deut. iii. 11.)

AMOS, the prophet, was a native of the town of Thekoa, which was about six miles south of Bethlehem. He was not a prophet's son, but a herdsman, and a gatherer of sycamore fruit, and the Lord took him as he followed the flock, to prophesy unto Israel. (Amos vii. 14, 15.) Amos saw his visions concerning Israel in the days of Uzziah, king of Judah, and in the days of Jeroboam II., king of Israel, two years before the earth-

quake. (Amos i. 1.) This earthquake is mentioned by Zechariah (xiv. 5), 'Ye shall flee, like as ye fled from before the earthquake in the days of Uzziah, king of Judah.' It is probable that the prophecies of Amos were delivered between the years 798—784 before Christ.

Many having repeated St. Jerome's saying, that Amos 'was rude in speech, but not in knowledge,' Bishop Louth, in his twenty-first lecture, shows that Amos was not behind the chief prophets in eloquence. The book of Amos is written in an excellent Hebrew style, but the orthography differs occasionally from the usual standard. Amos, the herdsman, has taken many figures from pastoral life, but he alludes also to history, geography, and astronomy.

AMOY, a city and port of China, in an island of the same name, near the coast, in the province of Fokien, 20° 25′ N. lat., 118° E. long. The name is a corruption of the native word Heamun. The district directly adjacent to this flourishing town, the emporium of the commerce of the province, is one of the most barren in all China; so that Amoy is dependent for the necessaries of life upon the more distant parts of Fokien, and on the neighbouring island of Formosa, which has been described as the granary of the eastern coast of China. Notwithstanding this serious disadvantage, the merchants of Amoy are among the most wealthy and enterprizing in the Chinese empire; they have formed connections all along the coast, and have established commercial houses in many parts of the eastern Archipelago.

During the south-west monsoon, the merchants of Amoy freight great numbers of their smaller junks at Formosa with sugar and rice, which they sell at various ports to the northward, returning home with cargoes of drugs. Above 300 junks of the largest class — some of them 800 tons burden — belong to Amoy, and trade with Borneo, Manilla, Macassar, Java, the Soo-loo Islands, Sincapore; and with Bankok, the capital of Siam.

Amoy is a principal third-class city, eight or ten miles in circumference; it is defended by a citadel, which is itself a mile in circuit, and commands the city as well as the outer town. This outer town is divided from the city by a chain of rocks, over which there is a paved road; and it is skirted by the outer harbour, while the city is bounded in nearly its whole length by the inner harbour and an estuary which deeply indents the island. The entrance into the outer harbour is by a passage 600 yards across between the islands of Amoy and Ku-lang-su. On each side of this entrance, and of both the harbours, there are strong fortifications. Shipbuilding, for the purposes both of war and commerce, is extensively carried on at Amoy.

Europeans were allowed to trade to Amoy for a few years subsequent to 1675; but in 1681, when this part of China was subdued by the Manchoo Tartar dynasty, which has always shown itself averse to foreign intercourse, the liberty to trade was discontinued. Several attempts were afterwards made to induce the Chinese to trade, but so many obstacles were opposed, such exorbitant duties demanded by the government officials, that notwithstanding the eager inclination of the Amoy merchants, these attempts did not succeed. On the 26th of August, 1841, however, Amoy was captured by the British; by the treaty of Nanking, dated August 29, 1842, this port, among others, was opened to our trade, and British subjects and a British consul allowed to reside at Amoy. By a supplementary treaty, dated October 8, 1843, a tariff of imports and exports was established, and other foreigners admitted to the same privileges as British subjects. [CHINA.]

(Davis's *China*; Macpherson's *Two Years in China*; Sir H. Gough's *Dispatch*.)

AMPELI'DEÆ, one of the names of the vine tribe. [VITIS.]

AMPE'RE, ANDRE' MARIE, was one of the many scientific men who, since the commencement of the present century, have distinguished themselves by the application of the highest branches of mathematical analysis in investigations relating to electricity, magnetism, and light.

Of his private life little is known; and his history, like that of most of the men who have passed their days in scientific pursuits, consists merely in statements of his birth and death, with a list of the works which he composed. He was born at Lyon, in 1775, and it appears that he resided in or near that city till about the year 1804, when he removed to Paris, where he died in 1836. Before this removal he was professor of physics in the central school of the department of Ain; and, subsequently, he held the appointment of professor of analysis in the Polytechnic School of Paris.

His first publication is entitled 'Considerations sur la Théorie Mathématique du Jeu' (Lyon, 1802). In 1805 he presented to the Class of Physical and Mathematical Sciences of the National Institute a paper entitled 'Recherches sur l'Application des Formules générales du Calcul des Variations aux Problèmes de Mécanique;' and in the 'Annales de Chimie' (1814) there is published his letter to Berthollet on the subject of Definite Proportions, or the Atomic Theory.

In September, 1820, Ampère read before the Académie Royale des Sciences a paper in which it was stated that the voltaic pile, or galvanic trough, when its opposite poles are connected by a wire, caused a magnetized needle suspended near it to deviate from the magnetic meridian; and soon afterwards he communicated an important discovery, which proved that some at least of the phenomena of magnetism could be represented by electricity alone. He showed that if two wires connect the opposite poles of a battery, they attract one another when so disposed that the currents pass along them in the same direction, and repel one another when the currents flow in contrary directions; and he contrived a delicate apparatus by which the phenomena were exhibited.

Ampère invented the well-known apparatus, consisting of a copper cylinder surrounding one of zinc, and containing diluted sulphuric acid, both

of which cylinders being supported by conical points over one end of a magnet placed in a vertical position, revolve about the magnet; from right to left if the north end be uppermost, and in a contrary direction if the south end be uppermost; and he caused a suspended magnet to revolve on its axis by the influence of a wire along which the galvanic fluid was made to pass.

From the mutual attractions and repulsions existing apparently in electrical, or, as they may be called, electro-magnetic currents, Ampère conceived that the magnetic action of the earth is the result of currents circulating within it, or at its surface, from east to west in planes parallel to the magnetic equator, and he contrived several ingenious machines in which terrestrial magnetism was an agent: among others, he disposed a wire bent in the form of a rectangle or a spiral, so that the plane might turn on a vertical axis; and, placing it in the position of the magnetic meridian, he allowed the electric current to enter at either extremity, when, exactly as a magnetized needle would do, it turned till it became at right angles to that meridian. He also exhibited to the Royal Academy of Sciences a copper wire bent in the form of a helix which possessed the properties of a magnet.

Ampère published at Paris, in 1822, a work entitled 'Recueil d'Observations Electro-Dynamiques;' in 1824, one which was designated 'Précis de la Théorie des Phénomènes Electro-Dynamiques;' (both of these are in 8vo.); and in 1826, in 4to., 'Théorie des Phénomènes Electro-Dynamiques.' Two years afterwards he published a 'Mémoire sur la Determination de la Surface courbe des Ondes lumineuses, &c.,' and six years subsequently an 'Essai sur la Philosophie des Sciences,' &c. Besides these works there were published separately several memoirs relating to his experiments in electro-dynamics; also, in the 'Mémoires de l'Institut,' in the 'Journal de l'Ecole Polytechnique,' and in other works, are many papers relating to Mechanics, Optics, and Natural History.

AMPHERI'STUS, a fossil fish, from the Isle of Sheppy. (König, *Icon. Fossil.*)

AMPHI'BIA (*ἀμφίβιος* having a double life), a zoological term, strictly applicable to such animals only as have the power of living indifferently both on land and in water, in consequence of possessing lungs for atmospheric respiration, and gills or branchiæ for aquatic respiration. Certain genera are indeed thus organized, as the proteus, siren, axolotl, and a few more; but besides these animals, by an extension of the term, others are included under it, namely reptiles, such as frogs, newts, &c., which begin life as aquatic beings with branchiæ, these branchiæ being afterwards lost, and true lungs becoming developed, with a corresponding change in the routine of the circulation. The *Amphibia* are regarded by some naturalists as constituting a distinct class, and by others as forming only an order of the class Reptilia. (See Cuvier's 'Règne Animal,' vol. ii. p. 101, and M.M. Dumeril and Bibron's 'Erpétologie Générale.') Formerly the term amphibia was vaguely applied; even mammalia of aquatic habits, such as the otter, the water rat, water shrew, &c., were called amphibious. It is now definitely restricted. [Reptiles; Batrachians; Aquatic Animals.]

AMPHIBOLE. [Augite.]

AMPHIBOLI'TE, a name sometimes given to Hornblende.

AMPHI'CTYONS ('Αμφικτύονες), members of a council in ancient Greece, called the Amphictyonic Council. Amidst the darkness which hangs over its origin we discover with certainty that this was one of the earliest institutions in Greece. No complete account has been given of it during any period of its existence by any ancient writer. The fullest information is supplied by Æschines the orator ('De Falsa Legatione,') who states that the Greek nations which were represented in the council were the Thessalians, Bœotians, Dorians, Ionians, Perrhæbians, Magnesians, Locrians, Œtæans, Phthiots, Malians, Phocians. Each nation was represented by certain sovereign states, of which it was supposed to be the parent: thus Sparta, conjointly with other Dorian states, represented the Dorian nation. Amongst the states thus united in representing their common nation, there was perfect equality. It seems probable that each nation, whatever might be the number of its constituent states, had two votes, and only two. The council had two regular sessions in each year, meeting in the spring at Delphi, and in the autumn near Pylæ, otherwise called Thermópylæ; but special meetings were sometimes called before the usual time. From its meeting at Pylæ, a session of Amphictyons was called a Pylæa, and the deputies were called Pylágoræ. There were also deputies distinguished by the name of Hieromnemons, whose office it was, as their name implies, to attend to matters pertaining to religion. Athens sent three Pylagoræ and one Hieromnemon. The former were appointed for each session; the latter probably for a longer period, perhaps for the year, or two sessions. The council entertained charges laid before it in relation to offences committed against the Delphic god, made decrees thereupon, and appointed persons to execute them. These decrees (Diodorus, xvi. 24), were registered at Delphi. The oath taken by the deputies bound the Amphictyons not to destroy any of the Amphictyonic cities, or to debar them from the use of their fountains in peace or war; to make war on any who should transgress in these particulars, and to destroy their cities; to punish with hand, foot, voice, and with all their might, any who should plunder the property of the god (the Delphic Apollo), or should be privy to or devise anything against that which was in his temple. This is the oldest form of the Amphictyonic oath which has been recorded, and is called by Æschines the ancient oath of the Amphictyons. An ordinary council consisted only of the deputed Pylágoræ and Hieromnemons; but on some occasions at Delphi, all who were present with the Amphictyonic deputies to sacrifice in the temple and consult the oracle of the god, were summoned to attend. Besides the list of Amphictyonic nations given by Æschines, we have one from Pausanias, which differs a little from that of Æschines,

and another from Harpocration, which differs slightly from both.

Æschines has left us in the dark as to the mode of proceeding in the Amphictyonic sessions. 'It seems that all the Pylagoræ sat in the council and took part in its deliberations; but if the common opinion respecting the two votes allowed to each nation be correct, it is certain that they did not all vote. The regulations according to which the decisions of the twelve nations were made can only be conjectured. We know that the religious matters which fell under the jurisdiction of the Amphictyonic body were managed principally at least by the Hieromnemons, but we are not informed respecting the limits which separated their duties from those of the Pylagoræ (Æschines, 'Contr. Ctes.' p. 68-72; 'Fals. Leg.' p. 43). Of the council as it existed before the time of Æschines, a few notices are found in the ancient historians. According to Herodotus (vii. 200) the council held its meetings near Thermópylæ, in a plain which surrounded the village of Anthéla.

We are told by Strabo (ix. 418) that after the destruction of Crissa by an Amphictyonic army, under the command of Eurýlochus, a Thessalian prince, the Amphictyons instituted the games which from that time were called the Pythian, in addition to the simple musical contests already established by the Delphians. Pausanias also (x. 7) attributes to the Amphictyons both the institution and subsequent regulation of the games.

The history of this celebrated council can only be made up from scanty materials, and is involved in great obscurity.

The Amphictyonic council long survived the independence of Greece. So late as the battle of Actium, B.C. 31, it retained enough of its former dignity to induce Augustus to claim a place in it for his new city of Nicópolis. We know from Pausanias (x. 8), that it was in existence in the second century after Christ. It reckoned at that time twelve constituent states, who furnished in all thirty deputies; but a preponderance was given to the new town of Nicopolis, which sent six deputies to each meeting; Delphi sent two to each meeting, and Athens one deputy: the other states sent their deputies according to a certain cycle, and not to every meeting. For the time of its final dissolution we have no authority.

It is not easy to estimate the effects produced on the Greek nation by the institution of this council. It is, however, something more than conjecture that the country which was the seat of the original members of the Amphictyonic confederacy was also the cradle of the Greek nation, such as it is known to us in the historical ages. This country was subject to incursions from barbarous tribes, especially on its western frontier. In the pressure of these incursions, the Amphictyonic confederacy may have been a powerful instrument of preservation, and must have tended to maintain the separation of its members from their foreign neighbours, and so to preserve the peculiar character of the Greek people. It may also have aided the cause of humanity; for it is probable that in earlier times differences between its own members were occasionally composed by interference of the council; and thus it may have been a partial check on war, or have diminished its miseries. In one respect its influence was permanently beneficial. In common with the great public festivals, it helped to give a national unity to numerous independent states, of which the Greek nation was composed. But it had a merit which did not belong to those festivals in an equal degree. It cannot be doubted that the Amphictyonic laws, which regulated the originally small confederacy, were the foundation of that international law which was recognised throughout Greece; and which, imperfect as it was, had some effect in regulating national intercourse among the Greeks in peace and war, and, so far as it went, was opposed to that brute force and aggression which no Greek felt himself restrained by any motive from exercising towards those who were not of the Greek name. To the investigator of that dark but interesting period in the existence of the Greek nation which precedes its authentic records, the hints which have been left us on the earlier days of this council, faint and scanty as they are, have still their value.

AMPHIDESMA, among zoologists, is the name of a genus of marine bivalve shells, which live in the sand on the sea-coast of tropical climates. The shells are oval or rounded, sometimes rather twisted and slightly gaping behind. They have two hinge teeth in each valve, and often distinct compressed lateral ones. The elastic cartilage is placed in a small triangular cavity just behind the hinge teeth. The animals of these shells are unknown; but they are supposed to have long siphons, like the Tellens, as the shells have a broad deep inflation on the back edge of the submarginal scar, formed by the attachment of the muscles which retract these siphons, as in the Tellens, from which genus it simply differs in the position of its cartilage.

Lamarck gave the name of *Amphidesma* to this genus, because he observed that it had a ligament and a cartilage, which he regarded as peculiar to this genus, he having, like the rest of the zoologists before the appearance of the Conchological Observations in the 'Zoological Journal,' considered what is usually called the ligament of bivalves as only one substance. It is, however, two substances, of very different structure and use; the outer, or ligament, being inelastic, and only employed to keep the two valves together, is formed of fibres extending from the edge of one valve to the other; but the cartilage is elastic and formed of perpendicular fibres, like the prismatic crystalline-structured shell, its use being to separate the valves from one another when the muscles which keep them closed are relaxed. When the valves are closed, this part is compressed by their edge. For this purpose it is sometimes, as in the shell under consideration, placed in a small triangular cavity close to the hinge, when the shell is said to have an internal cartilage, the ligament being still in its usual place. In other shells it is placed, along with the ligament, on the margin of the valves, and is pressed, when the valves are closed, against the ligament itself, which forms its outer wall. The resistance which the

ligament offers is the means of opening the shell. The cartilage has opaline reflections, and the cartilages of some large shells, as the mother-of-pearl shells, are sold by the jewellers under the name of *peacock-stone*, or *black opals*. They are not so much used now as formerly, but they are still much sought after on the continent, especially in Portugal.

AMPHIDETUS, a genus of Echinidæ found in the crag of Suffolk.

AMPHIGENE. [Leucite.]

AMPHILA, BAY OF, a bay extending for about sixteen miles along the west coast of the Red Sea, in 14° 30′ N. lat., and 41° E. long. from Greenwich. There are thirteen islands in the bay, the largest of which, also called Amphila, lying near its south-eastern extremity, is not quite a mile in length. None of them are now inhabited, though on one, called Kutto, there are the ruins of some houses. (Salt's *Abyssinia*, chap. iv.)

AMPHI'ON (Pander), a genus of fossil Crustacea (Trilobites), four species of which have been described, from Tyrone and Waterford, by Captain Portlock.

AMPHIOXUS. [Branchiostomata.]

AMPHI'POLIS, a Greek city, on the east bank of the river Strymon in Thrace, just below its egress from the Lake Kerkine, now called Takino, and about three miles above its influx into the Archipelago. This town was at first called Ennea Hodoi (the nine ways), and belonged to the Edonians, a Thracian people. The first attempt of the Greeks at colonization here was by Aristagoras of Miletus, who failed in the attempt, B.C. 497. The Athenians took Ennea Hodoi 437 B.C., and established a colony to which the name of Amphipolis was given. During the Peloponnesian war, B.C. 424, the Lacedæmonians, under their general Brasidas, took Amphipolis. The importance of Amphipolis was derived from its situation on a navigable river, a short distance from the sea, and from its neighbourhood to the gold mines of Mount Pangæus, and to the forests of Kerkine, from which, even now, many cargoes of timber are annually shipped at the mouth of the Strymon. Amphipolis was taken from the Athenians by Philip, king of Macedonia. Amphipolis has long been in ruins, and a small village, called Jeni-Keui, inhabited by Turks and Greeks, occupies part of its former site. Many medals are still found among the ruins of Amphipolis. The Roman road, called the Via Egnatia, ran through Amphipolis, or perhaps rather through Eion, which was situated at the mouth of the Strymon.

AMPHIPROSTYLE. This is an architectural term, compounded of three Greek words. It is used to designate structures having the form of an ancient Greek or Roman parallelogramic temple, with a prostyle or portico on each of its ends or fronts, but with no columns on its sides or flanks.

AMPHISBÆNA (Ἀμφισβαίνα, formed from ἀμφίς and βαίνω, to move in both directions), a term given to a group of serpent-like reptiles, capable of crawling with the head or tail foremost. Formerly these reptiles were placed with snakes in the order *Ophidia* (Cuv. 'Règne Anim.' vol. ii. p. 72); but they are now with justice regarded as constituting an aberrant type of the *Sauria* (family *Chalcidians, ou Cyclosaures* of Dumeril and Bibron, vol. v. p. 318 and 476), for though destitute of limbs, they agree with serpents neither in the structure of the jaws and tongue, in the character of the scales, nor in general habits and manners. In these reptiles the body is nearly of the same thickness from the head to the extremity of the tail, which terminates abruptly and blunt, so that on a superficial glance it is not easy to distinguish between the head and tail, more especially as the eyes are minute and buried, and only to be detected through the horny plate that covers them as little black dots. Hence the natives of South America regard these reptiles as double headed; and they believe that if the animal be cut in two, each distinct portion will continue to live, and that the two heads will mutually seek each other, and the bodies become reunited. The teeth are simple, conical, recurved, and fixed against the internal edge of the jaws. The nostrils are small, lateral, and pierced in a scaly plate. The lower jaw is fixed to the skull, as in birds. The head is blunt, and the muzzle generally resembles a small arched beak; it is covered with plates; the skin generally presents a covering consisting of circular ranges or annulations of quadrilateral scales. In some species a furrow runs along each side, and also down the middle of the back. At the lower part of the abdomen there is a row of pores. The tongue is broad, notched at the apex, and covered with papillæ. These reptiles are dull and inanimate, and crawl slowly; they bore into the soft earth, and feed on termites, ants, and insects; they are perfectly harmless. M.M. Dumeril and Bibron enumerate ten species, of which one (*A. leucúra*) is a native of Guinea; another (*A. cinérea*) of Northern Africa, Spain and Portugal. The rest are all natives of South America, and of some of the West India islands, as Cuba and Martinique.

As the best known species we may mention the *Amphisbæna fuliginosa*, a native of Brazil and Guayana. It measures nearly two feet in length, and is of a dusky brown colour. It lives upon ants and termites, and often conceals itself in their mounds. These reptiles are far from being attractive in their appearance; the annulations of the body and their twisting crawling movements give them a strange appearance; the natives regard their flesh when dried and powdered as a sovereign remedy in cases of dislocation and broken bones.

AMPHI'SCII, literally 'shadowed on both sides,' a Greek term applied by ancient astronomers to the inhabitants of the torrid zone, with whom the sun passes the meridian at noon, sometimes on the north, sometimes on the south, of the zenith, and whose shadows at noon are therefore turned to the south during one part of the year, and to the north during the remainder.

AMPHITHE'ATRE (*Amphitheátrum*), was a building used by the Romans for the exhibition of gladiatorial combatants, and of fights with wild beasts. The word literally means a double thea-

tre, or one composed of two theatres. In the theatre the spectators sat in a semicircle placed opposite to the straight line of the stage; in the amphitheatre, which was of an elliptic form, the seats were placed all round.

The form of an amphitheatre then is, on the plan, an ellipse, with a series of arcaded concentric walls, separating corridors which have constructions with staircases and radiating passages between them. It enclosed an open space called the aréna. The innermost concentric wall bounded the arena, and was from ten to fifteen feet above its level: from this wall an inclined plane ran upwards and outwards over the intermediate wall, staircases, and corridors, to a gallery or galleries over the outermost corridors. The inner and upper part of the inclined plane was covered with a graduated series of benches following the general form of the plan; these benches were intercepted at intervals by radial passages leading by a more easy graduation to and from the staircases which passed through the substructions of the benches to the corridors. These corridors, in the principal stories, continued uninterruptedly all round the edifice, and afforded easy access to every part. In cases where the radiating passages through the bank of benches were few, concentric platforms went round to make the communications complete. The external elevation of an amphitheatre was determined by its internal arrangement and construction, and it generally had two or more stories of open arches, which were necessary to give light and air to the corridors and staircases.

Roman amphitheatres were first constructed of timber. Afterwards they were constructed of brick or stone.

It was in the later times of the republic that the Romans were debased by the gladiatorial and other shows which led to the use and construction of amphitheatres. All the wealthy men in the state who were candidates for the highest offices, sought the popular favour by these barbarous entertainments; and the sums expended and the numbers of men and beasts engaged, and for the most part destroyed, in these games, seem almost incredible.

The amphitheatre of the Romans was raised, for the most part, within the town or city, on the level ground, of costly magnificence, and generally of enormous extent. Almost every important Roman colony or city bears indications of a constructed or excavated amphitheatre. The Colosseum at Rome would contain above eighty thousand persons; and even the little city of Pompeii contains the remains of an amphitheatre. The Roman garrisons appear to have contented themselves with camp-built amphitheatres alone. Of this sort,—the castrensian amphitheatre,—we have indications still existing in England; the principal are at Cirencester and Dorchester; but these were originally little more than mere excavations, or turf-built cinctures made up with what walling was absolutely necessary to form the grand concentric bank of benches.

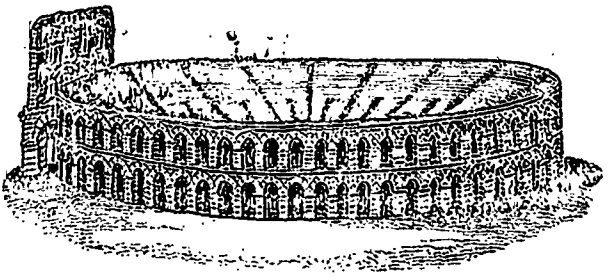
There is no Roman building, with the details of which we are so well informed, as of those of the amphitheatre. The remains which exist in various places show much more plainly what they were than the most elaborate descriptions can do. There is no sort of ancient edifice in which so much ingenuity is displayed in the arrangement, or so much skill in the construction, as were exemplified by the Romans in the design and execution of the amphitheatre; but the external composition has no striking merit.

The largest amphitheatre ever built was the Flavian Amphitheatre at Rome, commonly called the Colosseum, which was begun by Vespasian and finished by his son Titus, A.D. 80. The plan and elevation can be made out almost completely from the existing remains. It covers more than five acres. The dimensions, as given by different authorities, vary a little, but the largest external diameter is about 613 feet, and the shorter diameter about 510 feet. The internal arrangements of this huge structure cannot be understood by a mere description, without plans and sections. (See 'Penny Cyclopædia,' art. 'Amphitheatre.')

The external elevation of the Colosseum is composed of three series or stories of attached or engaged columns with their usual accessories, and a pilastraded ordinance, forming a species of attic, which is pierced with windows,—one in every other interspace. The lowest ordinance of columns rests on the upper step of the substructions, or on the ground-floor of the structure; it is of what is termed the Doric style or order, but in the debased Roman manner, and its entablature wants the distinguishing feature of that style, the triglyph. The intervening arches are semicircular; they spring from moulded imposts, and have moulded archivolts on their outer faces. The second ordinance is in the Roman Ionic style, having voluted capitals to the columns; and the third is in the Corinthian or foliated style: these, as before stated, rest upon continued but broken or recessed stylóbata, but their entablatures are, like the rest, perfectly unbroken throughout, and the arches in the intercolumniations in both correspond exactly —except in minor details—with those of the lowest or Doric ordinance. The pilasters have foliated capitals also, and are called composite; they rest on deep plinths under which there is a continued and recessed dado superimposing the Corinthian entablature;—this dado is pierced with holes or small windows alternating with those of the ordinance above, to give light to the corridor behind the lower and under the upper gallery on the inside. The crowning entablature is made bold and effective by deep modillion blocks or consoles occupying the whole depth of the frieze.

Next in size to the Colosseum, of existing structures of the kind, is the Amphitheatre of Verona. The great external cincture is entirely gone, with the exception of four arches and their accessories; but the great bank of concentric benches, with the staircases leading to them, and the parts about the arena, remain in a comparatively perfect state. The outer cincture was pierced with seventy-two arches, which number appears in the inner, with the corresponding radiating walls to the traversing passages and

staircases,—for this had not a second encircling corridor on the outside of the stairs block as the Colosseum has. The outer dimensions of this structure were 500 feet by 404 feet; the length



Amphitheatre of Verona.

of the arena is 242 feet, and the breadth or length, on the conjugate, 146 feet; the form, of course, was elliptical.

The amphitheatre of El Jemm (Tisdrus) in Tunis is 429 feet in extreme length. The amphitheatre at Nismes in France is large and in comparatively good preservation. The great external cincture of an amphitheatre remains in a very perfect state at Pola in Istria. There are also considerable remains of an amphitheatre at Capua, and of another at Pozzuoli near Naples. At Pæstum there are indications of an amphitheatre, though not a large one; at Catania, in Sicily, the upper and outer encircling corridor of an extensive amphitheatre is accessible, considerably under the level of the modern city, buried by the torrents of lava from Mount Ætna. Syracuse and several others of the ancient cities of Sicily exhibit remains or indications of smaller amphitheatres.

AMPHITHE'RIUM (Blainville). This fossil mammal, from Stonesfield, is now termed Thylacotherium by Owen.

AMPHIU'MA, a singular genus of American *Amphibia*, first noticed by Dr. Garden in 1771 in a letter to Linnæus. In this genus, allied in most essentials to the water newts, the form is elongated and eel-like, the skin is naked and smooth, the limbs, four in number, are minute and furnished in one species with three, in the other with two jointless toes. There are no ribs, and the vertebræ are fish-like. Teeth in the palate in two rows. An orifice exists on each side of the neck, indicating the situation of the branchiæ during the tadpole state. Eyes minute. These singular vermiform reptiles live in ponds, drainages, and sluggish waters, and bury themselves during winter in the mud. They are capable of existing on land, but as their food is to be acquired only in the water, they seldom wander far from that element. The three-toed Amphiuma (*A. tridactylum*, Cuv.) inhabits Louisiana, and is sometimes found in swampy places, under the decayed trunks of fallen trees; it attains to the length of three feet.

The two-toed Amphiuma (*A. didactylum*) is about eighteen inches in length. It is found in Georgia, Florida, and South Carolina, where it lives in ponds and ditches. It will also live on dry land. We are informed by Dr. Harlan, that an individual in the possession of Dr. Mease escaped from the vessel in which it was confined, and when found several days afterwards was brisk and lively. He also adds that these animals are sometimes discovered at the depth of two or three feet under soft mud, in which they burrow like worms, as was instanced in digging a street in Pensacola, when great numbers hybernating were thrown up during the winter season. The negroes of Florida call the Amphiuma *Congo snake*, and believe it to be venomous, but without foundation.

A'MPHORA was an earthen vessel, used to hold liquids both by the Greeks and Romans. It received its name from its two ears or handles. The proper form of the Greek word is *Amphoreus*. It is generally two feet or two feet and a half in height; and the body, which is usually about six inches in diameter ending upwards with a short neck, tapers toward the lower part almost to a point. The Attic amphora contained three Roman urnæ, or seventy-two sextaries, equal to about nine gallons English imperial-measure. The Roman, sometimes called the Italic amphora, contained two urnæ or forty-eight sextaries, about six gallons. There are specimens of earthen amphoræ in the British Museum.

There was another amphora among the Romans, which was a dry-measure, and contained about three bushels.

Earthen amphoræ of the Roman time have been occasionally found in England; they appear to have been sometimes used as funeral urns.

AMPLEXUS (Sowerby), a fossil genus of MADREPHYLLIGA, remarkable for the simplicity of its structure and the variability of its general figure. Occurs in the mountain limestone and Devonian limestone.

AMPLITUDE, the angular distance of a celestial body from the east point when it rises, or from the west point when it sets.

The term amplitude was also applied to what is more commonly called the *range* of a gun; that is, the whole horizontal distance which the gun will carry. It is sometimes also used in the integral calculus.

AMPTHILL. [BEDFORDSHIRE.]

AMPULLA'RIA, the name of a genus of fresh-water spiral univalve shells, inhabiting the

rivers and ponds of India, Africa, and South America. They are of a globular or rather depressed form, are covered with a thick olive or black *Periostraca*, and often banded. Their mouth is ovate, with the lips complete all round, and often slightly thickened or reflexed. The animals are somewhat similar to the common pond snail (*Paludina*), but the front of the head is nicked and furnished with two slight conical horn-like processes; they have long slender tentacles, with the eyes placed on small pedicels at their outer base; these horns and the tentacles often contract into a spiral form. But the great peculiarity of these animals is, that, unlike all other molluscous animals with comb-like gills, they have a large bag, which opens beneath, placed on the side of the respiratory cavity, which they probably can fill with water; and it is this structure which most likely gives them the power of living for a long time out of water, specimens having been brought from Egypt to Paris alive, by only packing them in a little sawdust. Their operculum is formed of concentric rings; in the species which come from India this part is generally shelly, but in those of America and Africa it is always horny. The Indian species lay globular pale green eggs about the size of small peas, which are placed in clusters on sticks and other things in the ditches; the eggs when dry form most beautiful objects. Some of the African species are reversed, or have the whirls of the shell turned from the right to the left, and these have been separated into a genus, under the name of *Lanistes*, on this account. It has been generally supposed by the geologist, that all the species of this genus are purely fresh-water, but the large Egyptian species, *A. ovata*, discovered by Olivier in Egypt, lives in Lake Mareotis, where the water is salt; therefore there is no proof that some of the fossil species are not marine.

AMPURDAN, a district in Spain in the province of Catalonia, between the river Ter and the town of Rosas. It comprises 32 miles in length, and 24 in breadth, and is the most fertile part of the province. It produces wheat, barley, Indian corn, and wine.

AMPU'RIAS, a town of Catalonia, in the district of Gerona, is situated on an elevated spot near the Gulf of Rosas, in 42° 7′ N. lat., 3° E. long. Its ancient name was Emporeium (Strabo, 160, ed. Casaub.), and it was a Greek colony of Marseille. The Romans called it Emporiæ. It was then a place of great trade, and had an excellent harbour. In the time of the Goths it was still a place of some consideration, and an episcopal see. It is now nearly two miles from the sea, and has about 2000 inhabitants. There are many ruins of ancient temples and other edifices near the town. (Balbi, *Géographie; Géographie Universelle.*)

AMPUTATION (from *amputo*, to cut off), the operation of cutting off a limb from the body. Although it must always have been clear, that it is a gain to save life even at the cost of a limb, when nothing but the removal of the limb can preserve the body, yet it was not always easy to make the sacrifice. Whoever understands the circulation of the blood, and considers the quantity that is sent, and that must necessarily be sent, to each member of the body for its nourishment, and the magnitude of the blood-vessels that are divided in cutting off a limb, will readily perceive how impossible it must have been to perform the operation of amputation before any certain mode was known of stopping the flow of blood from the wounded blood-vessels. No such mode of stopping hæmorrhage was known to the ancients: consequently, though they daily saw the necessity of performing the operation of amputation, yet they looked upon the operation with terror, and shrunk from the responsibility of undertaking it. But by the modern discovery of tying the arteries the bleeding from a wounded part is easily arrested. Of not less importance is the knowledge of some mode of preventing the loss of blood during the actual performance of the operation of amputation. So large are the trunks of the main blood-vessels that supply the limbs, and so great is the quantity of blood that flows from them in a short space of time, that loss of life is always the consequence of a want of command over these great vessels. By the invention of the instrument termed the tourniquet, an invention of the seventeenth century, this command is obtained. [TOURNIQUET.] By these instruments, then, namely, the tourniquet, and the needle and ligature, modern surgeons have such a perfect command over the blood-vessels, that operations may be performed, in which the largest trunks are divided without the loss scarcely of a single drop of blood. On this account, the mere removal of a limb excites in the modern surgeon no degree of anxiety; the operation of amputation is scarcely ever attended with the slightest hazard; nevertheless, there are circumstances connected with amputation of the greatest possible importance, delicacy, and difficulty, on a clear and correct view of which life depends. To obtain such a view, the most extensive knowledge, and the most accurate discrimination, are requisite; while, to act in conformity with it, a high degree of moral courage is often no less necessary. The discrimination of the cases that absolutely require amputation, in contradistinction to those in which the necessity of amputation may be superseded by skilful surgical treatment; the easiest and safest methods of performing the operation; and the best mode of treating the patient after the operation has been performed, involve considerations of the last importance which are often not without considerable difficulty; but these are considerations purely and exclusively professional, and cannot be treated of in a work like the present.

AMPYX (Dalman), a genus of fossil Crustacea (Trilobites), four species of which have been described by Captain Portlock, from Tyrone.

AMRITSIR, or UMRITSIR, formerly called *Chak*, the holy capital of the Sikhs, is a large city in the state of Lahore, 31° 33′ N. lat., 74° 52′ E. long.: population 100,000. Amritsir has a considerable trade in the shawls and saffron of Cashmere, and is a place of great opulence, owing to the resort of merchants and to its being the residence of some bankers of extensive dealings.

Its native manufactures are confined to coarse cloths and inferior silk goods. The Rajah Runjeet Singh built a fort here, and improved the town by bringing a canal to it from the Ravee river. The city owes its present name to a tank 135 paces square, which was built by the Gooroo Ramdas, who improved the town to such a degree that, for a time, it bore the name of Ramdaspoor. Ramdas died in 1581, and in the course of time the name of Amritsir, 'the pool of immortality,' was transferred from the tank just mentioned to the whole town. The sacred pool has a temple in its centre, which is dedicated to Govind Singh, who died in 1708, and was the last Gooroo, or religious leader of the Sikhs. A book, containing the code of laws, written by Govind Singh, is deposited in this temple, in the service of which upwards of 500 priests are retained.

A treaty was concluded between the British government and Ghulab Singh at Amritsir, on the 16th of March, 1846. This city is about 44 miles E. from the city of Lahore, and 1312 miles travelling distance N.W. from Calcutta.

AMSTERDAM, formerly called Amsteldam and Amstelredamme, 'the dam, dyke, or embankment on the Amstel,' is the capital of the province of Holland, in the kingdom of Holland, and stands on the south bank of the Y, an arm of the Zuider Zee, in 52° 22′ N. lat., 4° 53′ E. long., 32 miles N.E. of the Hague, and 107 N. of Brussels. The city is of the form of a crescent or bow, the curved side of which is towards the land, while the extremities and the other side rest on the Y. On the land side Amsterdam is surrounded by ramparts which are planted with trees, and form an agreeable promenade, and on the 26 bastions of which stand as many windmills. The ramparts are begirt by a semicircular canal 80 feet wide; and parallel to this within the city there are three great canals about two miles in length. These canals are lined with handsome houses, and in their building and dimensions may vie with the finest streets in Europe. The smaller canals which intersect the town in various directions are said to divide it into 95 islands, and to be traversed by 290 stone or wooden bridges. The Amstel divides the town into the eastern or old part, and the western or new part; it is crossed by a bridge 610 feet in length, 65 wide, and containing 35 arches, through the 11 central ones of which large ships can pass. Near the bridge is the great sluice (Amstelsluis) by which the waters of the river can be dammed out or allowed to flow through the city. The river enters the town from the S.E., cutting the outer canal and the three canals before mentioned at right angles: having crossed these it flows westward to the end of Kalver Straat, and then turning northward it runs past the palace, between which and the Y its outlet is called the Dam Rack.

Fronting the mouth of the river, and extending N.E. and N.W., lie the docks, which are formed by great dikes constructed in the Y, and are entered and secured by sluices. In the north-eastern quarter is the Nieuw Oostelijk Dok, the National Dockyard, and the island of Kattenburg, in which are

the quays and warehouses of the East and West India Companies, the Arsenal, and the Admiralty buildings. South of this quarter is the Plantaadje or Plantation, which is one of the principal promenades of the citizens; it is of considerable extent, and has canals all round it. West of the Dam Rack lies the Haring Packerye, or Herring Packery Tower, in the neighbourhood of which all the business connected with the export of herrings used to be transacted. Further west is the Nieuw Westelijk Dok: in this quarter also stands the Haarl-Poort or Haerlem Gate, one of the chief ornaments of the city.

The site of Amsterdam was originally a salt marsh, and in order to make a foundation for houses it is necessary to drive large piles or masts of wood through layers of peat and soft clay, which lie upon a firm subsoil 40 or 50 feet below the surface; so that the whole city, with its houses, canals, and sluices, is supported on a substructure of timber. Under the palace alone there are said to be 13,695 piles. The streets are generally in straight lines along the banks of the canals; among the finest are those built along the three canals mentioned above; they are, taking them in order from the ramparts, Prinzen Graght, Keyser's Graght, and Heeren Graght. The streets in the central parts of the town are narrow and without foot pavements. The private houses are nearly all of brick, painted and ornamented with different colours. Several of the streets are lined with rows of elms, limes, and walnut trees. The Kalver Straat and Nieuwe Dyk contain the best shops, the rich contents of which give a splendid appearance to these streets. The squares and market-places are numerous, but none of them are very large or magnificent.

Among the principal public buildings may be mentioned—the Palace, formerly the Stadhuis, a vast and imposing edifice, adorned with pictures and marble statues; it was taken possession of by Louis Bonaparte when King of Holland, and has been retained as a palace by the present royal family; the Beurs, or Exchange, which stands on five arches over the Amstel; the Oude Kerk, or Old Church, which is of great antiquity and remarkable for its painted windows and tombs; the Nieuwe Kerk, or New Church, a splendid structure erected in 1645; its carved pulpit and the ornamental brass work of its choir are universally admired; this church also contains several monuments, among others one to De Ruyter: the Stadhuis, formerly the Admiralty; it is a modern building, and contains several fine paintings; the Admiralty buildings; the Arsenal before-mentioned; and the Barracks, a memorial of French occupation.

The literary and scientific establishments of Amsterdam are very numerous. Among these are the Athenæum, the Institute, and the Society called 'Felix Meritis,' from the first words of an inscription on the building in which its meetings are held; in these courses of lectures are regularly delivered on all branches of science, literature, and art, and attached to most are museums, collections of paintings, and antiquities. The Association for the Promotion of the Public

Weal was established in 1784, and has branches in all the towns of Holland: its principal object is the education and improvement of the poor. The Museum, or Picture Gallery, is a truly national collection, consisting almost entirely of masterpieces of the Dutch school.

The population of Amsterdam, which in 1831 was 202,364, amounted in 1840 to 210,077. There are 47 places of public worship in the town,—13 churches of the Reformed Religion; 1 Presbyterian; 1 Church of England; 1 Remonstrant; 3 Lutheran; 2 Anabaptist; 1 of the United Brethren; 1 Armenian; 1 Greek; 5 Jansenist; 16 Catholic chapels; and 2 Jewish synagogues. The number of charitable institutions is 23, which includes hospitals for the aged and infirm, the insane, orphans and widows, foundlings, &c. There are three theatres,—one Dutch, one German, one French. Among the prisons may be mentioned the Rasp-huis for male offenders, and the Spin-huis for females; these were so called from the occupation of their inmates in former times, namely, rasping or sawing wood, and spinning.

The want of spring water is a great drawback on the advantages possessed by Amsterdam. Every drop of rain that falls is carefully treasured up in tanks, and water is brought from Utrecht and the Vecht and sold in the streets. Another inconvenience is the generally impure state of the stagnant water in the canals, the effluvia from which in summer is very prejudicial to health. To remedy this in some degree, the great sluices of the Amstel are closed at high water and the tide allowed to circulate through the town until it has fallen below the level of the river, which being then admitted in its turn expels the tide.

The harbour of Amsterdam is spacious and the water deep; it has recently been much improved by the construction of the Oostelijk and Westelijk docks, which are capable of containing 1000 large vessels, and are closed by large sluice gates. Owing to a bank (the Pampus) at the point where the Y joins the Zuider Zee, large vessels going and coming by that sea are obliged to load and unload a part of their cargoes in the roads. The navigation of the Zuider Zee also is very difficult and intricate by reason of its numerous shallows. To improve the access to the port a canal [HELDER CANAL] capable of admitting the largest class of merchantmen, was cut from the north side of the port of Amsterdam to Newdiep, opposite to the Texel, a distance of 50 miles. By this canal the Pampus is avoided, as well as the difficult navigation of the Zuider Zee, where ships were frequently detained for three weeks; and vessels can get to and from Newdiep without any risk in 18 hours. Steam-boats ply from Amsterdam to Campen on the Yssel, from whence other steam-boats ply to the towns on the Yssel and the Rhine.

Amsterdam has some manufactures of wool, cotton, linen, and silk; its diamond-cutting and jewellery retain a good repute; but its sugar refineries, soaperies, distilleries, tanneries, oil works, tobacco manufactories, and ship building, are the most valuable branches of industry. The various handicrafts and ordinary fabrics common to all large towns are also carried on in Amsterdam. It has also some glass works and iron works. This city must, however, be considered as a commercial and not as a manufacturing town. The imports principally consist of sugar, coffee, spices, tobacco, cotton, tea, dye-stuffs, wine and spirits, wool, grain, hemp, flax, pitch, metals, cotton and woollen stuffs, hardware, rocksalt, coal, &c. The exports are cheese, butter, seeds, rape and linseed oils, linen, spices, coffee and sugar from Java, tea, tobacco, indigo, cochineal, cotton, and other eastern and colonial products. About 260 large ships belong to Amsterdam, which are employed in the East and West India trade: 15 small vessels are engaged in the herring and whale fisheries. In the year 1840 the number of vessels that entered and cleared the port of Amsterdam stood as follows:—

Inwards	4177	Tonnage	437,695
Outwards	3981	Do.	423,060

The total value of the imports in 1832 was stated at £4,794,000

The total value of the exports in 1832 was stated at 3,081,000

The total value of the imports in 1840 was 7,944,958

The total value of the exports in 1840 was 6,225,083

Amsterdam, though no longer the centre of the exchanges, funds, and bill transactions of the world, still retains a considerable share in those operations. The celebrated bank which was established in 1609 ceased in 1796; and the Bank of the Netherlands was established on the model of the Bank of England by the late King of Holland in 1814. There are two railroads leading from Amsterdam, one to Haarlem, Leyden, and the Hague, which is in progress to Rotterdam; the other to Utrecht and Arnhem, which is to be extended to the Prussian frontier.

(Macgregor's *Statistics*; M'Culloch's *Dictionary*; Murray's *Hand-book for North Germany*.)

AMSTERDAM ISLAND, a small island in the Indian Ocean, discovered in 1696 by Vam Vlaming, a Dutch navigator, is situated in 37° 52′ S. lat., 77° 30′ E. long. It lies about midway between Madagascar and Australia, and is about 2100 miles W. of Cape Leeuwen in W. Australia. Amsterdam Island has been confounded in most maps, both English and foreign, perhaps all, with the Island of St. Paul, which lies on nearly the same meridian, but about 60 miles farther south. This mistake has extended so far that the description of St. Paul has been applied to Amsterdam, and vice versâ. These islands are of volcanic origin, and contain springs varying in temperature from 80° to 212° Fahrenheit. Fish and sea-fowl are very abundant. The islands are also the resort of great numbers of seals, which are hunted by the Americans for their skins, which they carry as an article of commerce to China.

AMSTERDAM, NEW. [BERBICE.]

AMU. [OXUS.]

AMULET, in barbarous Latin, *Amulétum*, or *Amoletum*. An amulet hung round the neck, or carried in any other way about the person, is absurdly believed to have the effect of warding off morbid infections and other dangers, and even of curing diseases by which the body has been already attacked. The belief in the efficacy of amulets has subsisted at some time among almost every people. The anodyne necklace, which consists of beads formed from the roots of white briony, and is sometimes hung around the necks of infants with the view of assisting their teething, is an instance of the still surviving confidence in the medical virtue of amulets. Such also is the belief entertained by seafaring people, that a child's caul on board their ship will preserve them from being lost.

AMUR, one of the largest rivers of Asia. Its remotest branch is the river Onon, which rises in 110° E. long., and 50° N. lat., and is itself formed by the Ingoda, the Erguné, and other rivers, rising near the confines of Siberia and China. The united stream thus formed, called the Amur, flows for some distance north-eastward, then northward through a mountain region called King-gan Yalo; and afterwards follows a very tortuous path, till it enters the Sea of Okhotsk, in about 53° N. lat. The whole course of the Amur, from the sources of the Onon to its mouth, amounts, perhaps, to nearly 2000 miles, owing to the great and frequent changes of its direction; in a straight line, the sources and mouth are only about 1330 miles distant from one another. As far as this river is known it abounds in fish; such as carp, shad, barbel, pike, sturgeon, &c.

The country watered by the Amur and its branches is divided by the King-gan Yalo Mountains into two parts, quite different in their character. The western portion is elevated, cold, dry, and little susceptible of cultivation: it belongs to the Russians, who in the 17th century expelled the former inhabitants, the Da-urians. The eastern portion, which belongs to China, is less elevated, milder, and much more fertile. [MANDSHOORIA.]

AMURATH. [MURAD.]

AMYGDA'LEÆ, a natural order of plants, the leaves of which yield the fluid called prussic acid. Owing to the last circumstance, the species are all more or less poisonous. On the other hand, those parts in which the prussic acid exists either in very minute quantity, or not at all, as the succulent fruit, and sometimes the kernel, are harmless, and are often valuable articles of food. The peach, the nectarine, the plum, the cherry, the almond, the apricot, prune, damson, and bullace are produced by different species of this order.

Besides the substance already mentioned, the bark of amygdaleæ yields a gum which is similar in its properties to gum arabic, and an astringent substance which gives some of the species so much efficacy in fevers, that their bark has been compared for utility to Peruvian bark; and even in some cases, as the coccomiglia bark of Calabria, the produce of *prunus coccomilia*, has been preferred.

AMYGDALIN, a substance obtained from bitter almonds after the fixed oil has been expressed. Its properties are—that it has the form of small, white, pearly, crystalline plates, which are inodorous and nearly tasteless. It is very soluble in water, both hot and cold; a hot solution deposits brilliant prismatic crystals in cooling, which contain water.

Amygdalin does not possess the poisonous properties of hydrocyanic acid, yet it is one basis of that powerful agent, and some account of it is necessary to understand the manner in which bitter almonds occasion a poisonous action. It is this substance which, when acted on by the emulsin, and water, forms both the hydrocyanic acid and the *volatile* oil of bitter almonds.

AMYGDALOID, the name of a variety of the trap rocks, when in a uniform base there are imbedded round or almond-shaped bodies, consisting of agate, calcareous spar, or zeolites, like almonds in a cake.

AMY'GDALUS, the genus from which the order derives its name, comprehends the almond, and the peach and nectarine.

A. communis, the common almond, is a native of Barbary. In this country it is only grown for the sake of its beautiful vernal flowers; but in the countries that have a long and hot summer, it is the fruit for which it is esteemed. This, which is produced in immense quantities, is partly exported into northern countries, and partly pressed for oil, or consumed for various domestic purposes.

A. Persica, the peach, once called the Persian apple, has for ages been an object of careful cultivation for the sake of its delicious fruit, and has almost naturalized itself even in the New World. In our gardens many varieties are known, which are classed under the two heads of peaches and nectarines, according as their fruit is smooth or downy.

Medical Properties.—Amygdalus communis is cultivated in the southern parts of Europe. There are two varieties of it, sweet and bitter. Of the sweet almonds the parts which are officinal are the seeds or kernels. The commercial varieties are numerous, but the most esteemed are the Jordan almonds. Triturated with water, sweet almonds form a grateful sweetish emulsion, which possesses considerable nutritious as well as demulcent properties. Almonds, as an article of dessert, are nutritive, but rather indigestible. In some persons they occasion, more particularly bitter almonds, an eruption similar to nettle-rash, and other troublesome symptoms.

Oil of Almonds may be obtained from either variety, but is yielded in great abundance by the bitter almond. Almonds which have become rancid yet yield by expression good oil, if a little calcined magnesia be added to the bruised almonds before being subjected to pressure. Almond oil is often adulterated with poppy oil. It is employed more as an external application, especially to the ears, than internally.

Amygdal. Amárœ, bitter almonds, are smaller and flatter than the sweet. Those most esteemed come from Provence, those least esteemed from

Barbary. They have a very bitter taste, and scarcely any odour, but if rubbed between the fingers with a little water, they emit a peculiarly agreeable odour. Triturated with water they form an emulsion, which by distillation yields a volatile oil, containing hydrocyanic acid. A fat or fixed oil is also contained in them, which may be procured by expression.

AMYL is an acrid volatile oil met with in the distillation of potatoes. It is purified by washing in water and re-distilling. It contains C^{10} H^{11}. The following are some of its compounds:—

Acetate of Oxide of Amyl, a colourless fluid procured by distilling one part of amyl, two parts acetate of potash, and one part concentrated oil of vitriol. *Amilen*, C^{10} H^{10}, a result of the distillation of amyl with dry phosphoric acid. It is volatile, colourless, and oily, and of less specific gravity than water. *Bromide of Amyl*, a volatile liquid without colour, and of greater specific gravity than water. *Chloramilal*, C^{20} H^{17} Cl^3 O^4, an oily yellow liquid, the result of the action of chlorine on amyl. Its taste after a time is very acrid. It is soluble in alcohol, but not in water. *Hydrated Oxide of Amyl* is a thin oil with burning taste. It burns with a blue flame, and boils at about 269° Fahrenheit. Its odour is suffocating. Its density is ·818. This oil is also obtained from corn, but with some variation of composition.

AMYOT, JAQUES, great almoner of France, and Bishop of Auxerre, rose to these high dignities from the humblest rank. He was born at Melun in 1513. When he came to Paris to continue his studies, he was obliged to act as servant to some of his fellow students, in order to procure the means of subsistence. After studying in the college of France, which had then been recently founded, and taking his degree of master of arts, at the age of nineteen, he went to Bourges to study law, where he distinguished himself so much as to induce the king's lecturer, Jacques Colin, to intrust him with the education of his nephews. Through the patronage of Marguerite de Valois, sister of Francis I., Amyot obtained a Greek and Latin chair at the University of Bourges. It was here that he began his translation of Plutarch's Lives, of which he dedicated the first books to the king, Francis I. The king, as a mark of his approbation, gave him the Abbey of Bellozane. Under the pretence of going to Italy to consult some manuscripts, he was entrusted with a letter from Henry II. to the Council of Trent, in 1551. He displayed much firmness and skill in his mission, and the Cardinal of Tournon recommended him to Henry II., as tutor of his three younger sons. Charles IX., on his coming to the throne of France, made Amyot his great almoner and keeper of the University of Paris; he also gave him the see of Auxerre. Henri III., on his accession to the throne, continued him in his dignities. Amyot died very rich, in his diocese, in 1593.

Amyot's translation of 'Plutarch's Lives' has great merit, both for fidelity and expression. North professed to make his version from it. He also translated the Greek romance of Heliodórus, seven books of Diodórus Siculus, the Greek romance of Longus, and the 'Moral Treatises' of Plutarch. Amyot's translations greatly contributed to fix the French language. He has given an Account of his Journey to Trent, in a letter addressed to M. de Morvillier. He composed a treatise on royal eloquence for the use of his pupil, Henri III., which was printed, for the first time, in 1805.

AMYRI'DEÆ, a natural order of plants consisting of tropical trees, the leaves, bark, and fruit of which abound in fragrant resin.

The odoriferous substances called gum elemi, bdellium, and resin of Coumia are all produced by different species of amyrideæ.

ANA, a Latin termination of the neuter plural form. *Ciceroniana*, for instance, would signify matters or things of any sort, about or appertaining to Cicero. In modern times this termination has been used to denote collections, either of remarks made by celebrated individuals in conversation, or of extracts from their note-books, letters, or even published works, or generally of particulars respecting them.

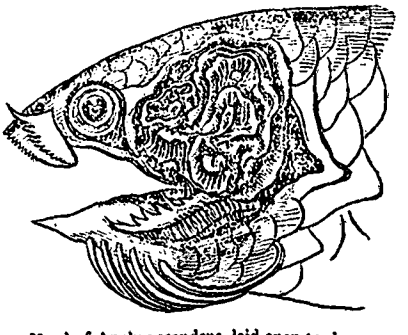
ANABAPTISTS, a religious sect. The word, composed of two Greek terms, properly signifies those who baptize a second time, or insist upon the necessity of a second baptism in persons whom they admit to their communion. It is sometimes applied to designate that large body of Christians in our own and other Protestant countries, one of whose articles of belief is, that baptism ought only to be administered to adults, and who, accordingly, rebaptize those who seek to join them. But this application of the name is quite unwarranted, and one against which the community in question have always protested. *Baptists* is the designation assumed by those who thus hold the doctrines of the non-validity of infant baptism, and the necessity of adult baptism. [BAPTISTS.]

The Anabaptists were, no doubt, the growth of the Reformation—though Protestant writers have laboured hard to make it appear that such was not the case. They were the ultra-radicals of the Reformation. Munzer, Stubner, and Storck, who were the first heads and apostles of the sect, had all been disciples of Luther; although no person could have more earnestly condemned their proceedings than did that great reformer. They first began to preach their peculiar doctrines in the town of Wittenberg, in Saxony, in the year 1521. In 1525, their followers, composed almost exclusively of the lowest rabble, rose in a general rebellion against the established authorities throughout that province, Suabia, Thuringia, and Franconia. But this insurrection, which it is but fair to remark was partly of a political character, was soon defeated; and Munzer himself, being taken, was put to death. The novel notions, however, which he had preached, spread as usual under persecution; and, some years afterwards, the mischief broke out again with new fury. In 1532, a numerous mob of these fanatics, conducted by John Matthias, a baker, of Haerlem, and John Boccoldt, a tailor, of Leyden, suddenly attacked the city of Münster during the night, and made themselves masters of the place. Their adherents immedi-

ately flocked thither from all quarters; and elated by their success, the congregated enthusiasts are stated to have given themselves up to extravagances far exceeding anything they had before practised. Matthias named Münster Mount Zion, and proclaimed himself its king. Having madly undertaken, however, attended with only thirty followers, to attack and disperse the forces which came to recover the town, he perished, with all who accompanied him. John of Leyden now assumed the royal dignity, and under his conduct the multitude is said to have proceeded to wilder excesses than ever. The city, however, was at length recaptured by the army which the bishop had brought up against it, on the 24th of June, 1535; and Boccoldt, having fallen into the hands of the victors, was soon after executed with the most terrific cruelties that hatred and revenge could dictate.

The most extravagant tenets, as well as conduct, have been commonly ascribed to the Anabaptists of Münster; but the accounts of a proscribed sect by their enemies, it is to be remembered, are scarcely to be received with implicit credit, nor is it necessary to recapitulate all the charges that have been made against them. Several sects have been since unjustly confounded with them; but for further information on the subject of the Münster Anabaptists, the reader may be directed to Mosheim's 'Ecclesiastical History,' sect. iii., pt. ii., chap. iii., where he will find the subject treated with great learning, though not in a spirit of much liberality or candour. The principal works relating to the Anabaptists are all referred to in that dissertation.

ANABAS (from *ἀναβαίνω*, 'to ascend'), the name given by Cuvier to a genus of Acanthopterygious fishes ('Règne Anim.,' vol. ii. p. 226), remarkable for the power of living for a considerable time out of the water, of travelling over the land for a great distance, and, according to some, of ascending trees, by aid of the fins, the tail, and the spines of the gill covers. The gills are constructed for retaining water, the pharyngeal apparatus being labyrinthiform, that is, divided into a number of irregular lamellæ, more or less numerous, forming cavities and little cells capable of retaining a certain quantity of water, which evaporates slowly. Of the restricted genus Anabas



Head of Anabas scandens, laid open to show the peculiar pharyngeal apparatus.

only one species is known, *Anabas scandens* (*Perca scandens*, Daldorf). It is a native of India and the Indian Archipelago, living in marshes. It has been observed by Dr. Cantor at Chusan. Its native name at Tranquebar is *panei-cri*, which signifies 'tree-climber,' and M. Daldorf states that he has observed it in the act of ascending palm-trees near the marshes, and taken it at the height of five feet above the surface of the water. ('Linn. Trans.' vol. iii.) This species is covered with large scales. The borders of the gill-covers are strongly denticulated, and the dorsal and anal fins have numerous spiny rays. Tail somewhat rounded; head broad; muzzle obtuse; mouth small; lateral line interrupted at its posterior third; length six inches; colour variable; fins violet. This genus, with several others allied to it, as *Polyacanthus*, *Macropodus*, *Helostoma*, *Osphromenus*, *Trichopodus*, *Spirobranchus*, and *Ophiocephalus*, form a family termed by Cuvier *Pharyngiens Labyrinthiformes*. Some of the land-travelling fishes of this *family* were known to the ancients, and the existence of such in India is noticed by Theophrastus.

ANA'BASIS, the title of a Greek work, in seven books, by Xenophon of Athens, which describes the circumstances of an expedition undertaken by the younger Cyrus, B.C. 401, against his brother Artaxerxes, king of Persia. It is also the title of the history of Alexander's campaigns by Arrian. The expedition of Cyrus is the first long march of which we possess a detailed account, and also the oldest extant document which gave to Europeans any precise notion of the countries watered by the Upper Tigris and Euphrates.

The army of Cyrus contained a large body of Greek mercenaries, among whom was Xenophon, who only took a command after the death of most of the generals. Cyrus set out from Sardes (now Sart) 38° 34′ N. lat., 28° E. long., and marched through Asia Minor to the passes in Mount Taurus that lead into Cilicia. He next passed through Tarsus, along the Gulf of Scanderoon, and through the north part of Syria to the Euphrates, which he crossed at Thapsacus, about 35° 14′ N. lat. He then marched S.E. through Mesopotamia, crossing the Araxes (the Khabour); and finally lost his life in an engagement with his brother on the plains of Cunaxa (the site of which is unknown), about 40 miles from Babylon (now Hillah), 32° 28′ N. lat., 44° 14′ E. long.

From Cunaxa commenced the retreat, commonly known as the Retreat of the Ten Thousand. The Greeks, after many difficulties, reached Trapezus, now Trebisond, on the Black Sea, in 41° 2′ N. lat., 39° 28½′ E. long. From Trapezus the army marched along the coast westwards for about 100 miles (direct distance) to Cotyora.

The following are the distances given by Xenophon in round numbers:—

	Stadia.
From Ephesus to Cunaxa	16,050
From Cunaxa to Cotyora (eight months)	18,600
	34,650

Xenophon adds the march of the Greek auxiliaries from Ephesus to Sardes (about 50 miles) to the distance from Sardes to Cunaxa.

The march may be considered as having terminated at Cotyora, as the army sailed from this place to Sinópe, now Sinub: their troubles, however, continued till they reached Byzantium, now Constantinople.

If we take the stadia of Xenophon at the rate of ten to a mile, an estimate which is above the truth, the whole distance marched is 3465 English miles, which was accomplished in fifteen months, and a large part of it through an unknown mountainous and hostile country, and in an inclement season. The expedition of the younger Cyrus has been discussed in the work of Major Rennell, and by several subsequent writers.

ANABATHRA, a fossil tree, from Allenbank, Berwickshire, is thus named by Mr. Witham, and figured in 'Foss. Veg.' t. 8 and t. 10.

A'NABLEPS (from *ἀναβλέπω*, *to* look up), a genus of Malacopterygious Osseous fishes, remarkable for the curious structure of their eyes, which, in consequence of the division of the iris and cornea by transverse ligaments, have two pupils, and appear as if double, whilst there is only one crystalline humour, one vitreous humour, and one retina. There is no other example known of such a modification of structure among the Vertebrata. This peculiarity of the Anableps has given rise to several stories of four-eyed fish, with exaggerated accounts of their habits. The *Anableps tetrophthalmus* inhabits the rivers of Guiana and Surinam. Its body is cylindrical, and covered with strong scales; its head is flattened, and snout blunt. The upper jaw projects beyond the lower. Its anatomy has been made the subject of a memoir by Lacépède, which is published in the second volume of the 'Mémoires de l'Institut.'

ANACARDIA'CEÆ, or the Cashew tribe, is a natural order of plants, consisting exclusively of woody plants, abounding in an acrid resin. Their juice is often used as a kind of varnish, for which it is well adapted, in consequence of its turning hard and black when dry. It is, however, often dangerous to use, because of the extreme acridity of the fumes, which are apt to produce severe inflammation in many constitutions.

One of the species, *Anacardium Occidentale*, is a small tree found all over the West Indies, where it is much cultivated for its bunches of fragrant rosy flowers, as well as its fruit. Its stem, if wounded, yields abundantly a milk, which, when inspissated, becomes intensely black and hard, besides which it secretes a gum not inferior to gum arabic. The nut is a kidney-shaped body, containing in abundance, beneath the outer shell, the black caustic oil of the order, which, when volatilized by heat, as happens in the process of roasting, is apt to produce erysipelas, and other disagreeable affections in the face of persons standing over the fumes; the kernel is a well known wholesome article of food. In the West Indies it is used as an ingredient in puddings, is eaten raw, and is roasted for the purpose of mixing with Madeira wine, to which it is thought to communicate a peculiarly agreeable flavour.

ANACHARSIS, the Scythian, was, according to Herodotus, the son of Gnurus, or, according to others, of Daucetas, and the brother of Saulius, who was King of the Scythians. His great desire of knowledge, joined to natural good sense, led him to lay aside the prejudices of his countrymen against intercourse with foreigners; he accordingly visited Athens, where he arrived in the time of Solon, with whom he is said to have formed an intimate friendship. The novelty of his appearance, his anxiety to learn, and the shrewdness of his remarks, made a great sensation among the Athenians. He is said to have compared the legislation of Solon to a spider's web, in which the weak might be caught, but which the strong would break through. The fact that at Athens political matters were discussed by the Prytanes before they were brought before the assembly of the people for approbation, led Anacharsis to say that at Athens wise men deliberated, but left the decision to fools. It is probable that to these and similar sayings Anacharsis owed his reputation as a sage and a philosopher. He is said to have been presented with the freedom of Athens, and to have been initiated in the Eleusinian mysteries: but Lucian justly doubts the correctness of the statement. His fondness for religious mysteries, however, is said to have been the cause of his death. On his way to his own country, when he reached Cyzicus, the inhabitants were performing the mysteries of Cybele, the mother of the gods. Anacharsis made a vow to the goddess, that if he returned home in safety he would solemnise these mysteries in the same manner. He performed his vow in a wooded district, called Hylæa, but was discovered by a Scythian, and denounced to the king, his brother. The king came to the spot to convince himself; and seeing Anacharsis perform the Greek rites, shot him dead with an arrow.

Aldus, in his collection of the Greek 'Epistolographers' (Venice, 1499, 4to.), published nine letters under the name of Anacharsis, which are pronounced by Bentley to be forgeries. The other works ascribed to Anacharsis, such as an epic poem of eight hundred verses, a work on war, on the laws of the Scythians, and some Greek customs, are lost; but they were unquestionably not more genuine than the letters.

(*Biographical Dictionary of the Society for the Diffusion of Useful Knowledge*, vol. ii.)

ANACHARSIS THE YOUNGER. [BARTHELEMY.]

ANA'CREON, one of the most famous lyric poets of Greece. He was born at Teos, a city of Ionia, in Asia Minor, probably about B.C. 560. Anacreon was held in high esteem by Polycrates, tyrant of Samos, and Hipparchus, son of Pisistratus, tyrant of Athens, two of the most eminent men of their age. He resided with Polycrates probably till the time of Polycrates' death, B.C. 522. He also visited Athens, which he left after the death of Hipparchus, B.C. 514. His old age seems to have been spent at Abdéra in Thrace, whither the Teians had emigrated, and founded a new city, when Teos was attacked by the Persian troops of Cyrus, commanded by Harpagus, B.C. 540. Of his personal character we know little; his genuine poetry shows that he was a lover of pleasure, but it presents him in a better light than the spurious odes which pass under his name.

All the poems of Anacreon were composed in the Ionic dialect. The odes attributed to him are all amatory and convivial. They have been much admired, and often translated and imitated. Cowley and Moore have translated some of the odes. Some pretty specimens of the poet (including one or two of Cowley's translations) are in Merivale's Anthology.''

Anacreon was first edited by H. Stephens, who got possession of two manuscripts, and published them, after careful collation, in 4to., in 1554. But many of the odes which pass as those of Anacreon are undoubtedly the spurious compositions of a later age. The genuine fragments have a character altogether different from these insipid verses, which are, moreover, often barbarous in expression. The fifty-five odes attributed to Anacreon are in Fischer's edition, Leipzig, 1793, 8vo., which contains also the fragments which are supposed to be genuine. The best separate edition of the fragments is by Bergk, 1834, 8vo.

ANADYR is a river in Siberia, little known, and principally remarkable for being the only considerable river of the globe whose sources lie within the polar circle, between the 68° and 69° N. lat. It rises in a lake in that range of the Aldan Mountains which traverses the north-eastern extremity of Asia, and terminates in Cape Tshukotshkoi-Noss, at Behring's Strait. The first part of its course is directed to the south-west till it passes to the south of the polar circle. It then turns suddenly to the east, and continues in this direction, though declining insensibly to the south; but the lower part of its course lies nearly parallel to the polar circle, at the distance of about 2½° of lat. In its eastern course it passes through 13° of long. It falls into the Bay of Anadyr, a large gulf of the Sea of Kamtchatka, forming an æstuary at its mouth. The whole course of this river is upwards of 500 miles. [SIBERIA.]

ANAGA'LLIS, a genus of the natural order *Primulaceæ*. A very common species is the *Pimpernel*, or 'Poor Man's Weather-Glass,' so called because its flowers generally open at eight in the morning, and close in the afternoon, and also refuse to expand in rainy weather. It is a little trailing plant with brick-red flowers, very abundant in corn fields; it was once thought useful in cases of madness, especially such as arose from the bite of rabid animals, but it is in no esteem at the present day.

ANAGNI, the ancient Anagnia, once the capital of the Hérnici, is now a town of between 5000 and 6000 inhabitants, 35 miles E. by S. from Rome, in the Campagna di Roma, with a bishop's see. It stands on a hill above the valley of the Sacco, in the middle of a fertile agricultural district. It is the residence of many noble families, twelve of the oldest of which are called 'the twelve stars of Anagni,' and from which several popes have sprung.

ANAGRAM signifies a new word formed out of the letters of any given word by the process of writing them over again, as the term literally signifies, or placing them in a new order. Sometimes the anagram is formed out of two or more words, and it may be itself always either one word or several. Many authors, instead of putting their names on the title-pages of their works, have, with an affectation of modesty, used the anagrams of their names. At one time, also, the anagram was much made use of by mathematicians in announcing discoveries, the credit or property of which they wished to secure to themselves without revealing the secret in which they consisted. Huyghens, Galileo, and Newton, intimated several of their discoveries in this way.

ANALEPTICS, from a Greek verb, which signifies to *restore*, comprise all the means, whether medicines, diet, or regimen, which are generally employed to restore the vigour of the system when it has fallen below the healthy standard, either from previous disease or any other cause. The term analeptic was formerly applied indiscriminately to any medicine which increased the powers of the system, whether it belonged to the class of stimulants or to the class of tonics; but the progress of chemistry, anatomy, and physiology has enabled us to recognize a difference in the chemical composition of members of these two classes of medicinal agents, as well as in their manner of acting upon the human frame. [STIMULANTS.] Stimulants act primarily on the nervous system, while tonics act primarily on the muscles and blood-vessels. Stimulants render the movements more frequent; tonics render them stronger. Stimulants, as we see with wine, exhaust the excitability; tonics, within a certain limit, maintain it. The action of the one is immediate and transitory, that of the other is slow and progressive, but more permanent, as is the case from Cinchona bark, or food. To take an example from their effects on the stomach, excitants quicken the digestion, as we see with capsicum or cayenne pepper, which we take with articles difficult to digest, as salmon; while tonics render the digestion more perfect, as occurs when we use cinchona in convalescence from disease. Though the most perceptible effect of tonics be upon the muscular system, as it is by a display of its powers that we judge of strength, yet the whole system feels the benefit of them when appropriately administered.

We need not enter into details respecting the particular action of tonics upon each set of organs of the body, as it may be stated generally that they all, sooner or later, begin to execute their functions more vigorously, the stomach first feeling the beneficial effects. But this state of improved action follows their use (that is, when they are medicinal or material tonics) only for a time; for their continued employment leaves the stomach in a state of debility, perhaps greater than at first—a fact of which we should never lose sight. These remarks will, we trust, induce all to observe caution both in taking upon themselves to use the articles termed analeptics merely because they feel weak, without knowing what is the cause of the weakness, or in urging their friends to have recourse to them at the commencement of disease, or even when it is subsiding, as more relapses are occasioned by a premature employment of tonics,

whether medicinal or dietetic, than by all other causes combined.

It is impossible to enumerate here, and give directions for the use of, all the analeptics, comprising, as they do, medicines, food, and regimen. The medicines are either from the mineral or vegetable kingdoms: when the former, they are chiefly preparations of the metals, as the salts of iron and flowers of zinc (oxide of zinc); from the latter, they are invariably bitter substances, as Cinchona bark, Calumba, quassia, camomile, &c. The analeptic means which fall under the head of regimen are, bathing, exercise, and the diversion of the mind.

ANALOGY is the similarity of ratios or relations. A *ratio*, or *relation*, means that two objects (which are called *the terms of the ratio*) are considered together in reference either to some quality which they have in common, or to some manner in which one has affected the other. Thus, two things may stand in a certain relation to each other in respect of quantity, magnitude, shape, colour, or other qualities; in which cases the subject of comparison is common to both, and belongs to them in a greater or less degree. Thus, when we say that one thing is larger, smaller, darker, more beautiful, more desirable, more probable, &c., than another, we mean that each of these pairs of things having in common the quality referred to, the one has it in a greater degree than the other. These, which might be called *ratios of degree*, differ altogether from the other class, which includes all those relations arising from the manner in which one term of the ratio has affected the other, or is necessarily connected with it, and not from any attribute which they possess in common. Thus, we may speak of the relation of God and man, of the relations of men as members of the same political society or of different political societies, of the relation of a bird to its egg, of a tree to its fruit, &c.; in which instances some act done by one to the other party, or by both reciprocally, or some influence which one term has exercised over the other, is signified, and not any quality or attribute common to both. In some cases of the latter kind there are words which express each term of the ratio *in respect of the relation;* and therefore they mutually imply each other. Such are, for example, parent and child, debtor and creditor, agent and principal. As in these cases it is impossible to conceive the one term without conceiving the other, these other terms might be called *ratios of implication*, as distinguished from those ratios in which a comparison is made of qualities existing independently in the things compared. For example, there cannot be a husband without a wife, nor is there any quality which a husband has, as husband, independent of the wife; but although there cannot be a short man or a tall man without a man of middle size, yet the height of the short or tall man is an absolute quantity, and independent of the comparison. In the cases of a common property, or ratios *of degree*, there are words which denote the relation of one term to the other, as height, depth, and consequently imply both terms of the ratio; but there is no word which expresses the *term* of the ratio itself, as in the case of ratios of *implication*. (Locke, 'On the Understanding,' b. ii. c. 25.)

When two ratios are compared, that is, when it is affirmed that the relation of two things is like the relation of two other things, the two ratios together form an *analogy*, and each pair of the corresponding terms of the two ratios is *analogous*. Thus, the bark stands in a similar relation to a tree as the skin to an animal; and consequently the one bears an analogy to the other: so the feathers of a bird are analogous to the hair of a quadruped, the admiral of a fleet is analogous to the general of an army. Of this nature are all fables and parables, in which the circumstances of the person to whom the lesson is addressed are illustrated, by supposing a relation similar to that in which he is placed. Thus the case of a man who affects to despise what is out of his reach, is portrayed by the fable of 'The Fox and the Grapes;' and so in other cases. The same is the principle of grammatical and etymological analogy; thus, if *to give* is conjugated *I give, thou givest, he gives, to live* would be conjugated *I live, thou livest, he lives;* the inflexions of the verbs standing in a like relation to each. Thus, *kingly* is to *king*, as *royal* to the French *roy*, and *regal* to the Latin root *reg*. The formation and development of language proceed almost exclusively on this principle.

It appears then, 1, That in an analogy there must be two ratios, and consequently four terms or objects of comparison; and 2, That there is no connection between resemblance and analogy, and that things may be analogous without being similar, and similar without being analogous.

1. With regard to the first of these propositions it should however be observed that, although there must be four terms, it is not necessary that all the four terms should be different. If there was such a necessity, one of the chief uses of analogy, as an engine of argument and discovery of truth, would be destroyed. All that is required is, that there should be two distinct ratios: of what terms those ratios may consist is indifferent. Thus, in the case of brethren, the parents are in an analogous situation in respect of each brother: so the grandfather is to the son as the son is to the grandson. In such cases as these, both the relations are known: frequently, however, the relation in which one thing stands to another being known enables us to discover, with greater or less certainty, the relation which the same thing bears to something else, which is unknown. Thus the moral government of mankind by the Deity, in this world, furnishes a means of conjecturing his religious government, both in this world and the next, independently of a divine revelation.

2. Resemblance being the similarity of some sensible quality, as form, colour, taste, smell, or sound, it has evidently no connection with analogy; and if things analogous happen to resemble one another, their resemblance is a mere accident, independent of their analogy. Thus, two brothers may resemble each other; but they might equally resemble each other without being bro-

thers, and would be equally brothers if they did not resemble each other. The confusion of analogy and resemblance is however of very frequent occurrence, and numerous examples of it might be cited.

All analogical comparisons are made by means of abstraction. A certain attribute belonging to each of two objects is considered separately from all the other attributes which those objects may possess, and a comparison is instituted between them in respect of that common attribute. Thus, the analogy between the skin of an animal and the bark of a tree arises from our leaving out of our consideration all those circumstances in which they differ, such as their colour, consistency, animation, sensibility, &c., and paying attention only to the use of each, as the outward covering, in one case, of the body and limbs of the organised being, and in the other, as the outward covering of the woody matter of the tree. [ABSTRACTION.] It is by a like process of abstraction, that an extended and vague meaning is given to many general terms, particularly those belonging to the moral sciences; and in this manner they are applied to objects to which they are only *analogous*, and which they do not properly designate. When an analogical application is made, simply to add beauty or energy to the expression by the transfer of words, this transfer, and sometimes the transferred word itself, is called a *metaphor*. [METAPHOR.]

The word *proportion* properly signifies an analogy of quantities or magnitudes, as a proportion of numbers, lines, or surfaces. In popular usage, however, *proportion* is commonly made synonymous with *ratio*, as when we speak of the proportion of deaths to births, the proportion of wages to profits. Sometimes also it is used for *portion*, as when we speak of a large proportion, a small proportion; in this case, however, a ratio is meant, as the *part* is considered as bearing a certain relation to the *whole*.

(Aristotle's *Poetic*, c. 21; *Rhetoric*, b. ii. c. 2; *Hist. An.* l. c. 1; Coplestone in the Appendix to *Whately's Rhetoric*; Whately's *Rhet.* part i. c. 2. s. 6.)

ANALYSIS, a Greek word, signifying, literally, *the act of unloosing* or *untying*; its opposite is *synthesis*, which is the act of putting together. The modern meaning of the term analysis is, the process by which facts, results, or reasonings are separated into their simple and component parts, or by means of which a simple truth is obtained, when given in a more complicated form; so that, in its most general sense, the greatest part of human knowledge consists in the results of analysis. It is, however, for the most part applied in a more particular manner to the methods employed in those branches of inquiry which most strikingly exhibit direct analysis, viz. mathematics and natural philosophy, particularly chemistry. By a very incorrect application of the term, algebra, the differential calculus, &c., have been called by the general name of *analysis*, in opposition, not to *synthesis*, but to *geometry*, in which latter science synthetical methods are most usually applied. This use of the term prevails on the continent to such an extent, that it must always be taken for granted, that '*analyse*' stands for the algebraical branches of pure mathematics. In this sense it is again subdivided into 'algebraical analysis,' and 'infinitesimal analysis,' the latter including the fluxional or 'differential calculus. And by 'geometrical analysis' is frequently understood the application of algebra to geometry. It must, however, be remarked, that the exact sciences have appropriated this word, simply because in these branches of knowledge the use of analysis has been made most conspicuous.

Confining ourselves to the primitive meaning of the term, it is obvious that all discovery must be entirely either the work of analysis or of accident; and that, therefore, geometrical analysis must be as old as geometry. Nevertheless this does not appear from the earliest treatises. The work of Euclid is strictly synthetical. Instead of taking the proposition asserted, and examining it by means of preceding propositions, and in the mean time assuming it to be true, in order to ascertain whether the results deduced from it agree or disagree with what has been already proved,—Euclid first enunciates the point which he means to establish, and then proceeds to put together the considerations by which it is demonstrated, leaving the learner nothing to do but to judge of the truth or falsehood of each argument as it arises, without taking into consideration the methods by which the arguments themselves were first obtained. This is the natural and proper method of teaching what has already been discovered, for its own sake; not only because it neglects to introduce difficult and embarrassing considerations, and allows of the subject being broken up into portions, which are easily learnt at one time, but because there is, in reality, no perfectly general and certain method of analysis which can be made obvious to the beginner. In attempting the analysis of a new problem, though the discoverer will naturally first try those methods which have been successful in preceding cases, he has no means of assuring himself beforehand which will be successful. The chemist is similarly circumstanced. Let a new substance, or one supposed to be such, be presented to him, from which he is required to find out whether it is already known, or if not, of what it is composed. No effective analysis can commence without requiring the results of all his previous knowledge, for he must have some method of recognizing each and every substance with which he is acquainted, previously to pronouncing whether or not that under consideration is one of them. He must then proceed to trials of that substance with various others, and nothing but the sagacity which arises from previous experience can direct him in his choice of the methods to be employed. No general rules of analysis can be laid down, that is, no processes which must end in the discovery of the component parts required. The same observations may be made on mathematical analysis.

The geometrical analysis is generally ascribed to the school of Plato; but, in reality, as we have already observed, must be of a date as early as

geometrical reasoning itself. The use of porisms, or problems admitting an indefinite number of solutions, the establishment of the properties of the conic sections, and the various efforts made for the duplication of the cube, and the trisection of the angle, all of which were the work of the school already mentioned, most certainly increased the power of the analyst, that is, made the means of discovery more obvious and more successful: but there is nothing in the methods which entitles them to the exclusive appellation of geometrical analysis. [Conic Sections; Duplication of the Cube; Loous; Porism; Trisection of the Angle.]

The peculiar distinction between algebra and geometry is, that the analytical method is pursued in the former from the commencement. The solution of a problem consists in inquiring into the consequences of the solution *supposed to be found*, by introducing at every step some known truth, such as will produce a more simple consequence, and thus reasoning backwards, so to speak, until at last the answer itself is directly produced in numbers, which was before implicitly involved in the conditions of the problem. The methods are more general than in geometry, that is, a larger number of problems may be solved by each process. The same observations apply still more strongly to the higher parts of algebra, and the differential calculus.

The solution of equations of the first four degrees, and the approximation to that of all higher degrees, render the analytical solution of a vast number of common problems a matter of certainty. The solution of differential equations, where that can be done, is an additional step of even a more important character. Within the last half century mathematical analysis has made considerable approaches to a state which enables us to determine, almost immediately, whether a problem can be solved by such means as we possess, or not; no small advantage, when it is considered how much time was previously wasted in the attempt to attain results which have since been shown to be impossible.

ANA'LYSIS. Chemical analysis is the separation of compound bodies, either into their simpler or their elementary constituents. When merely the number and nature of these are ascertained, it is termed *qualitative* analysis; but when their proportions also are determined, the analysis is *quantitative*. If the analysis consist only in determining the quantities of the *simpler* constituents of a compound, it is *proximate*, as when carbonate of potash is separated into carbonic acid and potash: but when the operation is extended, and the carbonic acid is resolved into carbon and oxygen, and the potash into potassium and oxygen, the analysis is *ultimate*; for neither carbon, oxygen, nor potassium (in the present state of our knowledge) is divisible into two or more kinds of matter.

ANAMORPHO'SIS (ἀναμόρφωσις, a 'remodelling or change of form'), is such a representation of an object that, except when viewed from a particular point directly, or in a cylindrical mirror, or through a polyhedral lens, it will appear to be distorted, or disconnected, or to be a view of something very different from the original object. Such representations are only made for the amusement of young persons, and therefore a very brief explanation of them may suffice; but the art of forming them has been treated at length in the 'Thaumaturgus Opticus' of Niceron, and in the 'Perspectiva Horaria' of Maignan.

Distorted figures which are to appear, when viewed directly from a given point, in the just proportions which they have in an original drawing or print, may be easily traced in the following manner. Let the original be covered with a network of squares, and imagine it to stand vertically on paper laid on a table, the eye being in a given position in its front; then draw lines through the ground line, in the directions in which planes passing through the eye and the vertical lines drawn on in the original would cut the paper, and other lines parallel to the ground line at places where planes passing through the eye and the horizontal lines on the original would cut the paper. If within the trapezoidal areas thus formed the parts of the original figure which fall in the corresponding squares be drawn, the figure thus traced will be the distorted figure required; and, when viewed from the assumed place of the eye, it will evidently appear exactly as, to an eye in the same point, the original would appear if it were placed in a vertical position with the base on the line which was drawn to represent it; that is, it will appear to be an exact copy of the original.

A distorted representation of some object, which is to appear correct on being viewed from a given point, and by reflection from a cylindrical mirror whose curvature and position are also given, may also be drawn on a plane by means of a perspective representation, as already described, of the squares drawn within a square circumscribing the original print or drawing. Thus a circular arc being drawn with a radius equal to that of the base of the cylinder, to intersect, between the eye and the ground line, all the oblique lines drawn in forming that representation; let lines be drawn from the intersections, making respectively equal angles with tangents to the circle, so as to represent the reflections of those oblique lines; and on the reflected lines set distances from the circumference equal to the distances of the parallel lines in the former representation from the same points in the circumference. Then curve lines connecting the points so determined will form, with the reflected lines, spaces within which the parts of the original figure are to be traced so as to correspond to those within the squares first drawn. This distorted tracing being laid horizontally on a table, and the mirror being set up vertically on the arc which represents its base, the reflected image will, to the eye, appear exactly similar to the original figure.

Distorted figures, which are to be seen corrected when viewed through a polyhedral lens or multiplying glass, may be traced mechanically thus:—let the multiplying glass be placed in a tube, like the eye-piece of a telescope, at a distance from the end to which the eye is to be applied rather greater than the focal length of the glass, and let a very

small aperture be formed in the cover at that end: then, on placing a lamp or candle before the aperture, the rays of light passing through the faces of the lens will project, on a screen placed perpendicularly to its axis, at any convenient distance beyond the focus, a number of luminous spaces corresponding to the several faces of the lens, with intervals between them. In these luminous spaces, whose outlines should be traced with pencil before the light is removed, there must be drawn by hand parts of a landscape or figure, so that, on looking through the aperture, they shall seem to form a correct representation of the intended object.

The portions thus drawn, when viewed in any manner except through the aperture, will be unconnected; and the intervals may be filled up with any objects at pleasure, so that the whole may appear confused, or may represent something different from the original landscape or figure: then, on looking through the aperture, towards the screen, the intervals before mentioned, and the objects drawn on them, will be invisible; and there will appear only the representation of the object formed by the junction of the parts within the outlines first traced, that is, a correct copy of the original object.

ANAMORPHO'SIS (Botany). [VEGETABLE MORPHOLOGY.]

ANAMOUR, CAPE, the most southern point in Asia Minor, is in 36° 2′ N. lat., 32° 50′ E. long. There was formerly a strong castle erected on the cape, which defended it on the only point where it was accessible from the sea. The cape is named from Anamour, the ancient Anemurium, a deserted place in the neighbourhood, in which are several ancient tombs and the ruins of two theatres. There is a place called Anamour Castle, six miles east of the cape.

ANANASSA, or the Pine Apple, is a genus of the natural order *Bromeliaceæ*, found wild in the woods of South America.

Ananassa sativa, is the common pine apple, of which a great number of varieties are known. [PINE APPLE.]

ANANCHY'TES (Lamarck), a fossil genus of Echinodermata, found in the chalk formations abundantly.

ANANI'AS was a son of that Onias, the high priest, who, being exiled from Jerusalem, built a Jewish temple near Heliopolis, in Lower Egypt, and founded the town of Onion on the eastern frontier of the Delta. Ananias and his brother Helcias, or Chelcias, were appointed the commanders of the Egyptian army by Cleopatra, when she warred against her son Lathurus, in the year 102 B.C., and he also successfully remonstrated against the intention of Cleopatra to seize the dominions of her confederate Alexander Jannæus. (Jost's *Geschichte der Juden*, vol. ii. p. 309—811.)

ANANI'AS, the son of Nebedæus, was high-priest from the year 50—66 after Christ. He was sent to Rome by Quadratus, the governor of Syria, in order to exculpate himself concerning the quarrels of the Jews with the Samaritans; Agrippina interceded for Ananias, and he was set at liberty. He condemned the apostle St. Paul (Acts xxii. 23, 24; and xxv. 1). At the commencement of the Jewish war Ananias and his brother concealed themselves in an aqueduct, but were discovered and killed.

ANAPÆST, a foot in Greek and Latin metre, consisting of two short syllables followed by a long syllable. It was sometimes called Antidactylus, as being the opposite of the dactyle, which consists of a long syllable followed by two short. Assuming accent in English to be the same thing with quantity in Greek and Latin, the word *témporal* would be an example of a dactyle, and the word *superádd* of an anapæst. The predominance of dactyles in English, and of anapæsts in French, forms one of the most marked distinctions between the musical character of the one language, and that of the other.

ANAPÆSTIC VERSE, a species of verse composed of a succession of anapæsts. Among the Greeks, the anapæstic verse was freely used both in tragedy and comedy; some forms of it occur very often in Aristophanes. Both in tragedy and comedy the anapæstic verse admits also dactyles and spondees. In English, only poems of the lighter sort have been usually written in anapæstic verse. Anstey's 'New Bath Guide' may be quoted as a well-known example.

ANAPLI. [NAUPLIA.]

ANARCHY (from the Greek ἀναρχία), properly means the entire absence of political government; the condition of a society or collection of human beings inhabiting the same country, who are not subject to a common sovereign. Every society of persons living in a *state of nature* (as it is termed) is in a state of anarchy; whether that state of nature should exist in a society which has never known political rule, as a horde of savages, or should arise in a political society in consequence of resistance on the part of the subjects to the sovereign, by which the person or persons in whom the sovereignty is lodged are forcibly deprived of that power. Such intervals are commonly of short duration; but after most revolutions, by which a violent change of government has been effected, there has been a short period during which there was no person or body of persons who exercised the executive or legislative sovereignty,—that is to say, a period of anarchy.

Anarchy is sometimes used in a transferred or improper sense to signify the condition of a political society, in which, according to the writer or speaker, there has been an undue remissness or supineness of the sovereign, and especially of those who wield the executive sovereignty. In the former sense, anarchy means the state of a society in which there is *no* political government; in its second sense, it means the state of a political society in which there has been a *deficient* exercise of the sovereign power. As an insufficiency of government is likely to lend to no government at all, the term *anarchy* has, by a common exaggeration, been used to signify the small degree, where it properly means the entire absence. [SOVEREIGNTY.]

ANA'RRHICAS, a genus of Acanthopterygious Osseous fishes, very nearly allied to the Blennies.

Cuvier remarked that they might be regarded as Blennies without ventral fins. They have round smooth blunt heads; elongated bodies, covered by minute scales; a single long dorsal and an extended anal fin, both separated from the caudal; no ventrals; the mouth armed with formidable teeth of two kinds, conical incisors and flat grinders. One species, the Wolf-Fish, Sea-Cat, or Cat-Fish, *Anarrhicas lupus* of Linnæus, is common in the northern seas, and in Britain is frequently taken on the east coast of Scotland and the Orkneys, though rare on the English shores. Its range extends to Greenland. It grows to the length of six feet, and is a ferocious and formidable animal, destroying the nets of fishermen; when caught it defends itself to its last gasp, inflicting severe wounds by means of its powerful teeth and jaws. It lives chiefly on crustacea and testaceous mollusca, and, like most fish which subsist on such food, its flesh is excellent eating, though, from the ugly appearance of the animal, usually rejected. It finds its way, however, to the Edinburgh market. The cat-fish is of a light grey colour marked with seven or eight broad vertical bands of bluish grey. When old it becomes darker. Its skin is covered with slime. For figures of this fish see Yarrell's *British Fishes*, vol. i.; Pennant; and Bloch.

ANAS, the duck, a genus of birds under which Linnæus comprehended a great number of species, now separated into distinct genera. The common wild duck (*Anas boschas*) is the type of the genus *Anas*, as restricted by modern zoologists.

ANASTA'SIUS I., emperor of Constantinople, succeeded Zeno, A.D. 492, through the interest of Ariadne, Zeno's widow, who afterwards married him. Anastasius was then sixty years of age. He was called *Silentiarius*, because he had been one of the officers whose duty it was to maintain peace and silence within the precincts of the imperial palace. The beginning of Anastasius' reign was favourable; he abolished several obnoxious taxes, and checked the abuse introduced by Zeno, of selling the public offices to the highest bidder. He also encouraged men of letters, and was himself a man of some learning. Theodoricus, king of the Goths, who, after defeating Odoacer, had made himself master of all Italy, sent an embassy to Anastasius, who recognised his title to the kingdom of Italy, and sent him the purple in token of it. But their good understanding did not last long. Theodoricus invaded part of Illyria and Mœsia, and defeated the Greek troops near the river Margus, now the Morava in Servia. Anastasius, on his side, sent a fleet and army which ravaged the coast of Italy as far as Tarentum, in 508.

Anastasius became obnoxious, on account of his avarice, to the people of Constantinople, who pulled down his statues and dragged them through the streets; and he was himself assailed with a shower of stones while in the Circus, and with some difficulty saved his life. To add to his misfortunes, the empire was attacked by the Bulgarians, the Arabs, and the Persians. The Persians invaded Armenia, and took the town of Amida, or Dinrbekr, on the Tigris, but were defeated by Justinus, who afterwards became emperor. A truce was concluded between Anastasius and Cabades, king of Persia, which lasted twenty years. Anastasius, like many other Byzantine emperors, took an active part in the theological disputes of the time, and this troubled his whole reign, and nearly cost him his crown. He died suddenly, in 518, at a very advanced age, and was succeeded by Justinus I.

ANASTASIUS II., emperor of Constantinople. His original name was Artemius, while he was secretary to the Emperor Philippicus Bardanes. After the deposition of Philippicus in 713, he was proclaimed emperor, sent a new exarch to Italy, and declared himself a follower of the Western church. Constantinople being threatened by the Saracens, Anastasius, to effect a diversion, sent a large fleet with an army to Alexandria, but the troops revolted, and proclaimed emperor one Theodosius, a receiver of the taxes. Anastasius having retired to Nicæa, in Bithynia, was defeated and obliged to surrender, with permission to retire to a convent, and to become a monk. Theodosius III. resigned the crown in 717 to Leo, called the Isaurian. Anastasius, from his convent at Thessalonica, made an attempt to recover the throne, but failed, and was beheaded with several of his followers in 719.

ANASTASIUS, I., II., III., and IV. [POPE.]

ANASTOMO'SIS; from *ἀνὰ*, *upon*, *στόμα*, *a mouth*, signifies the communication of blood-vessels with each other by the opening of the one into the other. All the branches which form such communications are called *anastomosing* branches. So numerous are these anastomosing branches, and so competent are they to carry on the circulation, that if the main trunk of the aorta be tied in the abdomen, or even in the chest, the lower extremities will receive a sufficient supply of blood to maintain their vitality through these collateral or anastomosing branches. The knowledge of this fact enables the modern surgeon to perform with ease and safety operations which the surgeon of former times would have pronounced impossible.

ANATASE. [TITANIUM.]

ANA'THEMA, a Greek word, properly signifying a thing set apart and devoted. Among the Greeks any thing offered to the gods, and placed in a temple, was called an *ἀνάθημα* (*anathéma*), or offering. But the dedication or setting apart might be to the powers of evil as well as to those of good, or, according to pagan notions, to the infernal as well as to the celestial gods. Hence the word came, in one of its applications, to signify much the same thing with the word accursed. It is thus that it is principally used in the New Testament. In this sense the form *anáthema* (*ἀνάθημα*) was employed, and not *anathéma*, though both are really the same word. In English we more frequently use the term anathema in the sense of the curse or severe denunciation itself than for the object of the curse.

ANA'TIDÆ, a family answering to the Linnæan genus *Anas*, and comprehending the various genera into which the ducks are now divided, as

Anas, Tadorna, Spathulca, Chauliodus, Querquedula, Oidemia, Somateria, and others.

ANATO'LIA, or NATO'LIA, is a geographical term, now generally considered as synonymous in extent with *Asia Minor*. It is impossible to define its limits very exactly, because, both in a political and a geographical sense, they have varied at different times. It will suffice for the present object to define Anatolia as the peninsula which terminates Asia on the west; being bounded on the N. by the Black Sea, on the S. by the Mediterranean, on the W. by the Greek Archipelago, and on the E. by Armenia and the Euphrates.

Mountain Chains and Central Plateau.—There are two ranges of mountains which run pretty nearly from east to west through Anatolia, at no great distance from the respective shores. These give a peculiar character to the country; for the district between them is an elevated table land, or plateau, more or less studded with mountains; while the margins of the country, exterior to these mountains, are intersected by the comparatively short rivers which water the peninsula. The southern range of mountains, which is the most important, obtains the collective name of the Taurus. These mountains, as well as the country generally, were imperfectly known until within the last few years; but the recent researches of Ainsworth, Hamilton, and Fellows, have thrown great light on the physical conformation of Anatolia.

At about 38° E. long. the Euphrates makes a semicircular bend, with a concavity towards the west; and in the hollow of this bend is a mountain mass, which may be deemed the eastern commencement of the Taurus. The highest point of this mass is the Akjah-Dágh, about 11,000 feet high. Several small rivers intersect the mass, and near one of these is the Pass of Erkenek, the only one by which an army could descend from the interior of Asia Minor towards Syria or Mesopotamia. Various minor chains branch off from this mass, and extend to Iskénderún (Scanderoon), Syria, and other parts; and these also contain several passes which were celebrated in ancient times.

From the mountain mass near the Euphrates the Taurus range extends in an irregular line, but with a general westerly direction. At about 35° E. long. it obtains the name of Búlghár-Dágh; it incloses a narrow strip of fertile country between it and the sea, watered by the Jíhún and the Síhún, and producing fruit, wine, and corn. Farther west the Taurus bears the name of Ichíli-Dágh, and presents two lofty isolated peaks, Karà-Dágh, and Allah-Dágh. From thence to about 29° E. long. the range has not been minutely examined; but at the latter place the Taurus obtains the name of Bábá-Dágh, and continues to the western extremity of the peninsula. The whole tract which lies between this Taurus range and the Mediterranean has an alpine character, though the mountains are not so high as the Alps.

Northward of the mountain mass near the Euphrates are the snowy peaks of *Anti-Taurus*, which, with it, may be deemed to form the eastern limit of Asia Minor. Many lofty and rugged mountains mark this region, some black and basaltic, and some granitic. Proceeding west is the chain of Karà-Bel, the Paryadres of the ancients. This range extends as far west as 35° E. long., and terminates with the Arjish-Dágh, the loftiest mountain of the peninsula. Mr. Hamilton, when he visited this mountain, first passed over hills of black basalt; then reached a conical hill consisting of sand and ashes, with a crater partly broken; and then a rocky tract covered with juniper, where the real ascent begins. South of the highest peak stands the Kartún, an isolated rock of feldspathic trachyte, like a gigantic fortress. Two hours' walk farther up, the ground spreads out into an amphitheatre, surrounded by steep and lofty ridges of hills, where the party passed the night. On proceeding farther on the following day, they found snow in all the crevices, and were obliged to find their way over dangerous glaciers. They succeeded, however, in reaching the highest attainable point of the mountain, though not the *actual* summit, which is a *mass* of rock with steep perpendicular sides, rising to a height of twenty or twenty-five feet above the ridge on which they stood. To the north and north-east extensive glaciers stretched down in one unbroken slope into a sea of clouds, proving all ascent on that side to be totally impracticable. From barometrical observations, combined with the result of two angles of elevation taken from different spots below the mountain, Hamilton concludes that the height of Arjish-Dágh is about 13,000 feet.

Near the spot just described, a number of mountain chains branch out in various directions. There is a ridge which connects the Taurus with the Anti-Taurus, and many minor chains shoot out from this towards the west. One extends from Arjish-Dágh to the vicinity of Angora; and the others bend round in various points, so as to join each other and form numerous basins, filled by lakes, which form one of the features of Asia Minor.

The Anti-Taurus and its offshoots do not form the northernmost range of Asia Minor; there is yet another range, which has been called the *Euxine* or the *Lazian* range; or rather the Lazian group forms the eastern extremity of the northern mountains; so that the Lazian, the Anti-Taurus, and the Taurus, may be considered together to mark the eastern boundary of Asia Minor. From the Lazian group spring numerous chains, which extend westward and include between them elevated terraces increasing more and more in height as they recede from the Black Sea. Indeed, the whole of the region between the central plateau and the Black Sea is studded with rugged mountain masses and chains, all of which have separate Turkish names.

The western part of Asia Minor has also its mountains. The Mórád-Dágh is a sort of central knot, from which branches extend to Mount Ida, Mount Olympus, and other elevations of historical celebrity.

The centre of Asia Minor is a very elevated plateau supported by the ranges of mountains

which we have described. Part of it is drained by the rivers that flow into the Black Sea; but an extensive tract, bounded by the great barrier of Taurus to the south, is covered with salt marshes, lakes, and rivers, possessing no visible outlet. This plateau is about 250 miles long from N. E. to S. W., and 150 miles broad. The chain of lakes is described as extending from the neighbourhood of Sýnnada (38° 50′ N. lat., 31° E. long.) to the Tyanitis, which lies at the foot of the Cilician Taurus, at the point where it turns to the north. In rainy seasons these lakes overflow, and, Leake says, would entirely submerge 200 miles of land, were it not for the ridges that traverse the plains and separate them into basins. He further states, 'that these basins form themselves into three principal recipients, having no communication, unless it be in most extraordinary seasons.' Under any other government these inundations would produce most abundant harvests; but they now run nearly to waste in watering pastures.

Sea-Coasts, Rivers, and Lakes.—The southern coast of Asia Minor presents an irregular outline, formed by two large semicircular bends presenting their convex side to the sea, and by two other bold curves with their convex side running into the land. The coast presents a very bold front to the sea throughout its extent from east to west. The western coast presents as jagged and irregular an outline as almost any coast in the world; deep bays and bold projecting peninsulas characterize it throughout. The channel of the Dardanelles, the ancient Hellespontus, separates Europe from Asia by a strait about forty miles long, and at its narrowest part not more than one mile broad. The wider opening of the Propontis or Sea of Marmara, about 140 miles long (taking the longest line), and forty-five broad in the widest part, is succeeded by the narrow channel of Constantinople (fourteen miles long), which unites the Sea of Marmara and the Black Sea. The coast of the Black Sea presents no very deep indentations or bays; and though the mountains are never very far removed from the shore, a considerable extent of coast from the entrance of the Black Sea along the shore of Bithynia is comparatively low; but as we advance eastward we find the high lands near the shore, and the depth of water as marked on the charts very great.

In noticing the rivers of Asia Minor, beginning at Iskénderún, we meet with the Jíhún (ancient *Pyramus*), which rises in about 37½° N. lat. and 37° E. long.: it flows through a hilly country for about 100 miles, and is navigable in the lower part of its course. The Síhún (ancient *Sarus*) has its source in the central table-land, and flows about 90 miles into the Gulf of Iskénderún. The Térsús-Chái (ancient *Cydnus*) a small river, descends nearly 4000 feet in 40 miles. The Gok-Sú, the Ak-sú, and the Dúdon (ancient *Calycadnus, Cestrus,* and *Calaractes*), are three other rivers farther to the west. The *Xanthus*, a river now better known through the researches of Sir Charles Fellows, is described under Lycia.

Westward of the Xanthus, one of the chief rivers is the Dollomon-Chái (ancient *Calbis*), which cuts its way through a ravine in a plateau 5000 feet high, and then flows about 100 miles towards the sea. No river of importance occurs from thence to the Mendere (ancient *Mœander*). This stream, so often alluded to by the ancient writers, rises about 38° N. lat., 30½° E. long., and flows about 170 miles into the Archipelago. Farther north is the Ghiediz-Chái (ancient *Hermus*), which is about as long as the Mendere, receives like it a great number of minor streams, and falls into the Bay of Smyrna. We then come to the Bákir-Chái, the Bóklá-Chái, and the Edrenos (ancient *Caïcus, Æsepus,* and *Rhyndacus*).

Advancing eastward to the shore of the Black Sea, we meet with the Zákáríyeh (ancient *Sangarius*), the second river in importance in Asia Minor. It comes from two sources in the interior table-land, and after passing Angora, follows an irregular line till its termination in the Black Sea, after a course of about 220 miles. Passing over several minor streams, we arrive at the Kizil-Irmák (ancient *Halys*), the largest river in Asia Minor. This river takes its rise about 40° N. lat., 38° E. long., and flows for about 150 miles through a picturesque valley along the northern border of the great central table-land, and afterwards follows a tortuous course till it empties itself into the Black Sea: the total length is about 430 miles. A few other rivers lie east of the Kizil-Irmák, but they are of no great importance.

Asia Minor contains many remarkable lakes. There is a basin or great depression between some of the groups of mountains, in which are numerous lakes, some fresh-water and others salt-water. The largest salt-lake is the Túz-Gol, 45 miles long by 18 broad. A ruined causeway, which connects the opposite banks, is covered with a thick coat of salt lying over a coat of soft mud: when the waters are high it is submerged; when low it is quite dry. The banks are flat, the environs barren and covered with saline plants; along its eastern side extensive salt marshes stretch from N.W. to S.E., and its southern and south-western shores are surrounded by impenetrable marshes partly covered with saline incrustations. The lake yields much salt, which is easily obtained, although the state of saturation of the water, which is very high in the dry season, is diminished in the wet season, owing to several little rivers and streams emptying themselves into the lake. The other salt-water lakes of this basin are of minor importance. Among the fresh-water lakes is the Bei-Sheher, 20 miles long, and from 4 to 7 wide; it is abundantly supplied with fish, and is surrounded by steep and wooded hills, intersected by picturesque valleys and well-cultivated plains.

Numerous other lakes are met with in different parts of the peninsula. Among these is Lake Abullionte, between Mount Olympus and the Gulf of Múdánieh, 20 miles long by 12 broad; Lake Mányas, on the eastern borders of Mysia, 14 miles long by 8 broad; Lake Búldúr, 17 miles long by 4 broad; and Lake Chárdák, 20 miles long by 4 broad. In the last-mentioned lake, in the dry season, the water is thoroughly saturated with salt, which crystal-

lizes on the surface, and is scraped off with large wooden spades.

Geology, Climate, and Productions.—The general characters of the geology of the peninsula, says Hamilton, are simple. The eastern extremities consist of trachytic rocks, which towards the west are succeeded and partly overlaid by black volcanic breccia and peperite, containing angular fragments of trap or trachyte. The western part of the peninsula consists of calcareous rocks, which seem to belong to the scaglia or cretaceous formation. All these are horizontal, and the lower portion is a hard compact scaglia, like that of Greece and the Ionian islands. This (the lower, hard portion) contains no fossils, but is overlaid by beds thirty or forty feet thick, containing a great variety of shells, amongst which are Corbula and Modiola. The beds vary considerably in hardness, and some are rather silicious. Near the summit of the hill are the ancient quarries, in which lie large blocks hewn and ready to be removed. The same writer says, that he could not find the line of junction between the limestone and the trachyte, so as to form any conjecture of their relative ages.

Both Hamilton and Ainsworth, who have contributed so much to our knowledge of the peninsula, had a firmán to inspect the mines, and they visited many which were hitherto unknown, except to natives. Mining skill is in a very low state in this country. There are copper mines near Bákír-Kurehsí, not far from the Black Sea, in the plateau of Iflání; near Chalwár, on the eastern side of the Lazian group; near Tireból, on the Black Sea; near Tókát, and many other places. There are iron mines near Unieh, on the Black Sea; silver with copper, in the mines of Tireból; silver and lead at Denek, in the Begrek-Dágh, east of the Kizil-Irmák. Nitre is got at Karà-Búnár, in the south-eastern part of the central table-land. Rock salt abounds in all parts, especially in the north-eastern part of Asia Minor and in the tract round Angora. Hot springs occur in all the provinces: those of Brúsá are celebrated, and are even visited by European patients. The hot springs near Eregli, in the south-eastern part of the central table-land, require a short notice. They issue out of narrow crevices on the summit of a ridge of low hills near that town, and form a succession of small pools and conical hills, which have been created by the gradual deposit of the earthy matter with which the water is charged, and which forms at first small pools round each orifice, which, by the rapid evaporation of the water, are soon raised into cones. The confined water and gases are heard bubbling under ground. Some of these springs deposit pure salt round their orifices, others pure sulphur, and others sulphate of lime, or gypsum, which is the most frequent.

No general description would convey a correct idea of the climate of Asia Minor, which presents probably more varieties than the peninsula of Spain and Portugal, with which it has been compared as to extent of surface. The comparison may be carried farther. In the numerous chains of lofty mountains which traverse them, in their high plateaus, and in the diversity of climate depending on the configuration of surface, there is a considerable resemblance between the two countries. The climate of both is also materially affected by the adjacent seas. The western shores of Asia Minor, occupied by the Greek colonies, and known by the ancient names of Æolis and Ionia, have been celebrated in all ages for their genial climate, and for the fertility of their valleys. The summers here, as generally through Asia Minor, are hot, and especially where the local situation does not allow the passage of a free current of air. The high plains of the interior are described as excessively cold in the winter season. The contrasts sometimes exhibited between the high regions and the adjacent lower valleys are such as characterise all countries which have a similar configuration of surface.

The northern shore of Asia Minor being exceedingly humid, parts of the mountain slope, from the edge of the high plains, are covered with magnificent forest trees of various kinds. The forests, stretching west from Boli, the great and almost inexhaustible source of supply to the Turkish navy, contain ash, elm, plane, poplar, larch, and beech, and some oaks of large size. It is known to the Turks by the significant name of *Agatch Degnis*, or Sea of Trees. Major Rennell assigns to this forest a length of 120 miles from W. to E., and 40 in breadth.

The coast of the Euxine and the valleys of the northern side of the peninsula are probably the finest part of Asia Minor. On the south the immense mass of Taurus, rising like a wall, and in parts capped with eternal snow, leaves between the Mediterranean and its basis a comparatively narrow slip, and gives to the climate of the southern coast, combined with its geographical position, a character very different from that of the north side of the peninsula. The amount of rain is much less, and the summer heat of the coast is often excessive. Unlike the northern shore, which appears to be well supplied with ever-flowing rivulets, some portions of the Lycian shore, where the mountains press close on the sea, have no water from April to November, but what they can keep in reservoirs. The winter torrents cease with the rains. The mountains of Karamania are in general well wooded, and Alexandria is mainly supplied with fuel from them. The timber of this coast, at least that near the shore, is chiefly pine, but not in general of large dimensions. The mountains of Taurus contain a great variety of forest trees and shrubs.

Population.—Asia Minor is mostly inhabited by Greeks and Turks. In Lycia the Greek population is not one-tenth part of the population, and in Bithynia the Turks are at least three times as numerous as the Greeks. The Greeks are more numerous in the western part than in the east and they form a considerable portion of the population of all the commercial towns, and several districts in the western part are exclusively inhabited by them. All those who call themselves Turks are not of Turkish origin, and there are several hundred thousand so-called Turks who are descended from Greek ancestors. There are also Mohammedan Armenians in the east. Those

among the Turks who style themselves Osmanlis are settled in the country, and lead an agricultural life; though many of them live during the summer time in tents, which they carry to those places which are used exclusively for agricultural or pastoral purposes, leaving their houses empty in the villages. The Turkomans are most numerous in the east; but such among them as are shepherds, and lead a real nomadic life, wander as far as the table-lands of the western provinces. The Yürüks are nomadic Turks, probably of the same origin as the Osmanlis, and are numerous in the northern, middle, and eastern parts. In the same district there is a considerable number of Kurds, who are either permanently settled or wander with their herds to the western table-lands, and sometimes, though seldom, as far as Brúsá. The Turkish peasants are a brave and honest set of men, full of confidence, faithful, trustful, ready to assist, liberal, generous, and by no means so grave as the Turks are generally represented, but fond of social pleasures, chatting, dancing, and singing; they are very ignorant and credulous. Fellows, perhaps, gives too favourable a description of them; but he was in the Arcadia of Asia Minor. Religious prejudices are less strong in the peninsula than in European Turkey, and generally the population of Anatolia may be considered as the best part of the whole population of the Turkish empire.

Commercial Routes.—There are but few towns of any great importance in the heart of Asia Minor; and the roads are chiefly commercial routes, proceeding in two or three directions from frontier ports and cities.

No road, in the European acceptation of the term, has ever existed of their own construction in the empire of the Turks. Asia Minor still presents remains of the Roman lines of communication; and of the Roman bridges many yet are in use. Relays of post-horses are still maintained by the Turks at distant intervals. They are principally stationed at the large towns of the leading routes. The most frequented road is that from Smyrna to Constantinople, and the only one by which there is a regular communication, except by caravans. Important as is the trade between these great cities and the rest of Europe, this correspondence takes place but twice a month, and is managed by the Austrian mission and consulate, which, as well as the Russian, despatch, at stated periods, a post to the European capitals. The Porte keeps in constant employment a corps of Tatar couriers, by means of whom they make all their communications. On a smaller scale every pasha has a similar establishment. The route from Smyrna to Constantinople passes by way of Magnesia, Thyatíra, and Moukalitsch. In Turkey the traveller is frequently astonished amidst the general desolation at the extreme care manifested in keeping up the tanks and fountains stationed at convenient distances. The burial places are always planted with cypresses, and frequently exhibit more of care and art than the habitations of the living.

Another route extends from Constantinople to the southern Pashaliks. It goes by way of Mudanieh, Brusa, the Olympus range, Kutaya, Afium-Kara-Hissar, Konieh, Káráman, and Gulnar.

A third route advancing in the same direction from the Bosporus, at Eski-shehr pursues an exact eastern course, and reaches Angóra, through a country everywhere infested with tribes of Turkomans. Angóra (Ancyra) is the capital of Galatia. It is situated on an elevated plain, famed for its fruit, and produces goat-hair nearly as fine as silk, which is made into camlet. The territory to the S.E. of Angóra is covered with Turkoman encampments. These people pay no tribute to the Porte, which is without power to enforce it, or to rid the country of them. From Angóra there are two routes towards the south-eastern extremity of the peninsula; one by way of Ooscat and Kesarieh, and one by Hassan-Dagh to Tarsus, where the Tatar couriers embark for Egypt and the coast of Syria.

Besides the above routes there is a pilgrim route from Constantinople to the south-eastern part of the peninsula, and two caravan routes from Smyrna; one through Allah-Shehr, Afium-Kara-Hissar, Konieh, &c., and the other to the southern provinces.

History.—The term *Asia Minor* is one of comparatively recent date; it was unknown to Greek, and, we believe, Roman geographers, at least under the early emperors. The word *Anatolia* originated under the Greek empire, and referred to the country which lay east of the seat of government.

Asia Minor was known to the later Greeks under various divisions. Mysia, Lydia, and Caria, occupied the western shores; Lycia, Pamphylia with Pisidia, and Cilicia, to which Lycaonia was sometimes added, bounded it to the south; and on the north coast were Bithynia, Paphlagonia, and Pontus. The elevated plains of the interior presented to the east Cappadocia, extending over the mountains to the borders of the Euphrates; and Phrygia on the west, bounded towards the sea by Mysia, Lydia, and Caria. Parts of Phrygia and Cappadocia afterwards became Galatia. The Greeks established colonies, and built towns on all the three coasts of the peninsula, but their occupation was most complete and continuous on the west side. Here we find, lying from N. to S., the districts of Æolis, Ionia, and the little Dorian confederation in the S.W. angle of Caria. Herodotus speaks of thirty different nations or tribes which inhabited Asia Minor in his time. Many of these figure conspicuously in the history of Greece and her colonies. The country remained in part under Persian dominion for two centuries before Alexander's time. After Alexander's death Asia Minor formed part of one of the kingdoms into which his vast empire was divided; when the Romans afterwards seized it, they divided it into Asia within Taurus and Asia beyond Taurus.

Under the Roman dominion the peninsula attained the most uniform and settled state, and no doubt also the most prosperous condition that it has ever yet enjoyed. The decline of that power, and the feeble sway of the eastern empire, laid open the country to new invasion from the east,

and the Mussulmans began to establish themselves in some of the eastern parts of the peninsula, about A.D. 700. When the first crusaders, under Peter the Hermit, landed near Nicæa, in 1096, they found the Turks in possession of this part of Asia, and separated from the capital of Alexis only by the waters of the Propontis and the Bosporus. The Turks had then become numerous in Asia Minor, and the population must for some centuries have been gradually undergoing a change.

At the present time the Turkish province of Asia Minor is divided into several pashaliks or distinct governments, the chiefs of which are appointed by the sultan. The increasing power of Russia in the north-east, and of Egypt in the south-east, have rendered the tenure of the sultan in Asia Minor much more precarious than formerly.

(Rennell's *Western Asia;* Leake's *Asia Minor;* Beaufort's *Karamania;* and the recent researches of Hamilton, Ainsworth, and Fellows.)

ANATO'LICO, a town of western Greece, built on a rocky island in the midst of the lagoons which form part of the Gulf of Mesolunghi, 38° 40′ N. lat., 21° 35′ E. long. The fishermen of Anatolico use canoes which they call Monóxyla, 'single pieces of wood,' formed of the hollow trunks of trees.

ANA'TOMY, from a Greek term (ἀνατομή), which literally signifies 'the separation of a thing into parts by cutting;' the term anatomy is used to signify particularly dissection, or knowledge acquired by dissection. Anatomy is at once an art and a science; an art, inasmuch as the pursuit of it requires skilful manipulation; and a science, inasmuch as certain general principles are deducible from it. The object of anatomy is to ascertain the structure of organized bodies. Of the two great kingdoms of nature, the inorganic and the organic, it comprehends the whole range of the latter. Like the organized kingdom itself it forms two divisions, the one including the structure of plants—vegetable anatomy; the other the structure of animals—animal anatomy. Animal anatomy is divided into comparative and human; comparative anatomy includes an account of the structure of all classes of animals, excepting that of man; human anatomy is restricted to an account of the structure of man only. Human anatomy is subdivided into descriptive, general, and pathological.

Descriptive Anatomy comprehends a description of all the various parts or organs of the human body, together with an account of their situation, connections, and relations, as these circumstances exist in the natural and sound, or as it is technically termed, the normal condition of the body. The human stomach for example, is composed of a number of membranes, which are united in a particular manner; a number of blood-vessels which are derived from particular arterial trunks; a number of nerves which proceed from a particular portion of the brain and spinal cord; a number of absorbent vessels and so on; moreover, this organ is always placed in a particular cavity of the body, and is always found to have certain specific connections or relations with other organs. The anatomy of the human stomach comprehends an account of all the particulars of this kind, which are uniformly found to concur in all human bodies in which the conformation is regular or natural; and so of every other organ of the body; and because such an exposition of the structure of the various organs includes a description of all the circumstances that relate to their organization, it is called *Descriptive Anatomy.*

After the study of the human body in this mode has been carried to a certain extent, with a certain degree of success, it necessarily gives origin to a second division of the science, that termed *General Anatomy.* It is found that many of the circumstances which belong to any one organ, belong at the same time to several organs; and that thus several individual circumstances are common to many organs. Of the membranes, for example, of which it has been stated that the stomach is composed, some are common to it and to the intestines, to the bladder, to the uterus, to the air-passages, and so on. In like manner with respect to any one of these membranes, when its structure is carefully examined, it is found that in many points its organization is exactly similar to that of all other membranes. This view extended leads to further important and interesting results. All the arteries of the body, whatever their situation, size, or office, are found to be composed essentially of the same substances, disposed in nearly the same order and form. All the veins have, in like manner, a structure essentially the same. All the absorbent vessels, all vessels of every kind, all the bones, muscles, and nerves, the whole external covering of the body or the skin, widely as these various structures differ from each other, present no material difference as far as regards the organization of each particular class. Hence various organs of the body are disposed into what are called common systems, and these common systems are said to consist of common substances or tissues. All the vessels, for example, are collected and arranged under one common class, called the vascular system: in like manner, all the bones are collected and arranged under another class, called the Osseous System; all the muscles under another, called the Muscular System; all the nerves under another, called the Nervous System, and so on. The material that enters into the composition of each of these systems consists of a substance of a peculiar nature; but as this substance is more or less generally diffused over the whole body, entering as a constituent element into the various organs, it is termed a common substance or tissue. What is termed the common Cellular Tissue, for example, is the substance of which all the membranes and vessels of the body are composed; the Muscular Tissue is the substance of which all the muscles are composed; the Nervous Tissue is the substance of which all the nerves are composed; and thus the structure of the body, analysed in this mode, innumerable and complex as the substances appear to be of which it consists, is ultimately reduced to a very few simple materials, by the combination and modification of which all the different animal substances are produced. That part of anatomy which displays those common

substances, and which describes all that relates to these differences, analogies, combinations, and so on, is termed *General Anatomy*. Descriptive and general anatomy, then, include an account of the structure of the body as it exists in the state of health.

But there is no organ of the body, and no tissue which enters into its composition, which is not subject to disease; in consequence of disease, the regular or natural structure of the component substances of the body becomes changed in a great variety of modes. That part of anatomy which displays these diseased or morbid changes, and which describes all the circumstances relating to them, is called *Pathological* or *Morbid Anatomy*.

We may say then, that Descriptive Anatomy comprehends an account of all the parts or organs of the body as they exist in the state of health; General Anatomy comprehends an account of all the separate substances of which those organs are composed, not as these substances exist combined in organs, but as they form distinct and peculiar substances; Pathological Anatomy comprehends an account of all the changes of structure produced by disease, whether in individual organs or in the primitive or common substances of which these organs are composed.

The importance of the study of anatomy cannot be over-rated in the education of the medical profession; it lies at the basis of all correct knowledge of the functions of the human body. Diseases cannot be properly understood without it, and it has been through its agency that many of the successful operations of surgery have been introduced.

A general knowledge of the structure and functions of the human body is useful to all persons, as it may often be the means of preserving their health, and preventing many of the accidents which occur to life through ignorance. An account of the structure of the most important organs of the body, and the functions they perform, will be found in this work under the names of the different organs.

ANATOMY ACT. Before the passing of 2 & 3 Will. IV. c. 75, on the 1st of August, 1832, it was illegal for the medical practitioner or teacher of anatomy to possess any human body for the purposes of dissection, save that of murderers executed pursuant to the sentence of a court of justice, though he was liable to legal proceedings for ignorance of his profession; and while the charters of the medical colleges enforced the duty of teaching anatomy by dissection, the law rendered such a course impracticable. But as the interests of society require anatomy to be taught, the laws were violated, and a new class of offenders and new crimes sprung up as a consequence of legislation being inconsistent with social wants. By making anatomical dissection part of the penalty for crime, the strong prejudices which existed respecting dissection were magnified tenfold. This custom existed in England for about three centuries, having commenced early in the sixteenth century, when it was ordered that the bodies of four criminals should be assigned annually to the corporation of barber-surgeons. The 2 & 3 Will. IV. c. 75, repealed sec. 4 of 9 Geo. IV. c. 31, which empowered the court to direct the body of a person convicted of murder to be dissected after execution. Bodies are now obtained for anatomical purposes under the regulations enacted in 2 & 3 Will. IV. c. 75, which is entitled, 'An Act for regulating Schools of Anatomy.' The preamble of this act recites that the legal supply of human bodies for anatomical examinations was insufficient, and that in order further to supply human bodies for such purposes various crimes were committed, and lately murder, for the sole object of selling the bodies of the persons so murdered. The act then empowers the principal secretary of state, and the chief secretary for Ireland, to grant a licence to practise anatomy to any member or fellow of any college of physicians or surgeons, or to any graduate or licentiate in medicine, or to any person lawfully qualified to practise medicine, or to any professor or teacher of anatomy, medicine, or surgery; or to any student attending any school of anatomy, on application, countersigned by two justices of the place where the applicant resides, certifying that to their knowledge or belief such person is about to carry on the practice of anatomy. For the particular provisions the act may be referred to.

The supply, under this act, of the bodies of persons who die friendless in poorhouses and hospitals and elsewhere is said to be sufficient for the present wants of the teachers of anatomy; and the enormities which were formerly practised by 'resurrection-men' and 'burkers' have ceased. The number of bodies annually supplied in London for the purposes of dissection amounts to about 600.

ANATOMY, COMPARATIVE. By Comparative Anatomy is meant the anatomy of all animals compared with that of man, and of each other. Comparative Anatomy is the basis of sound zoology; it was recognized as such by Aristotle, and most diligently pursued by that great man, whose works attest his industry and acuteness. Comparative Anatomy supposes an investigation of the structure of the component organs of animal bodies, a tracing-out of their varied modifications, of their reduction and development, a certification of the presence of some or the absence of others. For ages after the time of Aristotle the science of Comparative Anatomy was utterly neglected, its importance was unappreciated; but happily in modern days it has received a new impulse and has been extensively and sedulously cultivated. The zoological systems of Ray and Linnæus are founded more or less purely and naturally on anatomical data. Daubenton worked out the anatomy of the mammalia for Buffon; and others followed in the same track, till Cuvier commenced his labours, gave to the world his 'Anatomie Comparée,' his 'Ossemens Fossiles,' and his 'Règne Animal,' and left an imperishable name. We need but mention the names of Camper, Savigny, Geoffroy St. Hilaire, De Blainville, Audouin, and Meckel, on the continent; Hunter, Home, Bell, and Owen, in our own country, to prove that men of great ability have addressed themselves to the subject.

Anatomy and zoology must go hand in hand. It is on the results of comparative anatomy only that a natural system of zoology can be established. It is anatomy which teaches us how to discriminate, on solid data, between the great groups of the animal kingdom, and to subdivide them according to their respective conformations. This is the great analytic power in the hands of the zoologist, the test which he must ever apply, and without having recourse to it he can take no step with certainty. It is this science which enables the zoologist to reconstruct, as it were, an extinct animal from the examination of a few of its fossil relics; and to declare what its habits and its general economy were when in far distant ages it lived upon the surface of our globe; it is this which gives us a key to the hieroglyphic characters presented to us in the form of the fossil relics of races long passed away, indicative of the changes which our planet has undergone; and it is this which exalts our ideas of the vastness and grandeur of creation, of the power and wisdom of the Creator.

For the results of comparative anatomy with respect to zoological classification, see ANIMAL.

ANAXA'GORAS, a philosopher of the Ionic school, born at Clazómenæ, in Ionia, about B. C. 500. He died about B.C. 428. Born both to rank and wealth, he had leisure to apply himself to philosophy, and as some authorities say, under Anaximenes, but this opinion is inconsistent with the probable period of Anaximenes. In the twentieth year of his age he went to Athens, where he taught for thirty years. He had among his hearers Pericles, Euripides, Socrates, and Archelaus. It is said that in B.C. 432 he was prosecuted at Athens on a charge of irreligion. If this is true, he must have left Athens and have returned to it. In some way he escaped from his persecutors, and got to Lampsacus on the Hellespont, where he died.

The chief treatise of Anaxagoras was on Nature, several fragments of which have been preserved by Simplicius and others. Vitruvius attributes to him a work on Perspective.

The leading notion of Anaxagoras was that all things were in a state of confusion, till Nous (intelligence) placed them in order. Many strange opinions on physical philosophy are attributed to him. He said that the sun was a mass of hot iron larger than the Peloponnesus. His opinion that the moon derived her light from the sun was probably not his own. The fragments of Anaxagoras were collected by W. Schorn, Bonn, 1829.

ANAXIMA'NDER, the kinsman, pupil, and successor in the Ionic school of Thales, was born at Miletus in B.C. 610, and died there (as is supposed) about B.C. 547, aged 63. Little is reported of him, except that he was the first who constructed maps and gnomons, one of the latter of which he erected at Sparta; and that he first discovered the obliquity of the ecliptic. The latter is improbable; though, if he were the first who constructed a gnomon, it is probable that he would also be the first who gave anything like a measure of the obliquity. Some say he thought the earth spherical; others that it had the figure of a drum. At Sparta he is said to have predicted an earthquake which threw down the greater part of the city. The philosophic opinions attributed to Anaximander are not very clearly expressed, nor do they appear to be worth the labour of any investigation.

ANAXI'MENES, the pupil and successor of Anaximander, but this is very doubtful. He was born at Miletus. The years of his birth and death are not known, but he is said to have died about the time of the capture of Sardis, which event, if the capture by Cyrus the Persian is meant, took place B.C. 546. Two epistles of his to Pythagoras are preserved by Diogenes Laertius, but they are certainly not genuine.

He held that air was the first principle of all things—that all things were formed of air, and all things revolved with it. His exposition of this principle is not characterized by much originality or consistency.

ANBURY and CLUB-ROOT, a sort of galls produced by insects on the roots of cabbages, turnips, holyhocks, and other species of cultivated plants, and popularly but incorrectly supposed to arise from peculiarities of *soil*, or from growing the same crop successively on the same field, or to be owing to variations of seasons. They are produced by the deposition of the eggs of a weevil in the part attacked.

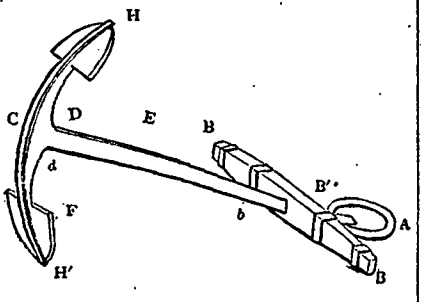
No peculiar rotation of crops, nor peculiar manure for dressing the soil, can be of any avail in preventing anbury, or in stopping its progress when the insects have obtained a lodgment within the roots. The destruction of the adult insects before they have laid their eggs is the only remedy, though in the case of so small a species it is peculiarly difficult to put in practice.

ANCENIS. [LOIRE-INFERIEURE.]

ANCHOR (from ἄγκυρα, and the Latin *anchora*), a heavy iron instrument for fixing a vessel in a harbour or road, thence called an anchorage. Under some form it must have been as ancient as vessels of any magnitude; and it is accordingly mentioned by Greek and Latin authors, by whom also the invention, like many others which from clumsy beginnings have passed through different stages of improvement, is ascribed to various persons. The first anchors were probably only large stones or crooked pieces of wood loaded with heavy weights, but among the Greeks, latterly, they were made of iron; of these the earliest had but one fluke, afterwards the other was added, and finally they were furnished with stocks. Each ship had several, of which the principal one was called ἱερὰ or sacred, and was reserved for the last extremity. This corresponds to that which has since been denominated the 'sheet anchor.'

The number of anchors carried by a ship have been finally reduced to four principal ones, all of which are disposed at the bows. These are the best and small bowers (bowyers), the sheet, and the spare anchor, and to them are added the stream and the kedge anchors, which are used for particular purposes, and are generally carried 'inboard.' The following are the several parts of an anchor:—

A is the ring; BB the stock; DB′ the shank; C the crown; CH and CH′ the arms; D*d* the throat; E the trend (CE = ⅓ CA); F a palm or fluke; B′*b* the small; H the bill or peak; the end of the shank, near A, is called the nut.



When the anchor is let go in any manner from the vessel's side the heaviest end, or crown, will tend to become the lowest part, and the whole mass having reached the bottom will most commonly fall upon the crown and on one end of the stock; from this position therefore the anchor is to be canted or turned over, so that it may lie as in the figure, before it can hold. Now, it is evident that if the stock were very short, the pull of the cable would tend rather to drag the end of the stock along the bottom than to lift up one of the flukes, as must be done in canting the anchor; whereas, if the stock were longer, the cable would act with increased leverage, whatever might be the length of the shank; hence the longer the stock, within the practical limits of stowage, the more certainly will the anchor turn properly; and, when hooked in the ground, the more powerfully will it resist any effort to overset it.

When the anchor has been turned, the stock then, as in the figure, lying horizontally on the ground, and the point of a fluke touching the ground, it is evident that the force exerted by the ship to draw the anchor towards itself, compounded with the weight of the anchor (exclusive of the stock, and diminished by about one-seventh on account of the loss of weight in water), will produce a resultant force by which the fluke is made to enter the ground. And it may be easily proved by the composition of forces that, when a fluke is just entering the ground, the most favourable position for it is that in which its plane makes with the ground, or with a line joining the centre of the stock with the extreme point H′ of the fluke, an angle whose tangent is expressed by $\frac{w}{t}$, where w expresses the weight of the anchor in water supposed to be applied at the centre of gravity of the shank and arms, and reduced to the direction of a vertical line passing through H′, and t expresses the tension of the cable, or the power exerted by the ship in drawing the anchor.

It appears from numerous experiments made by Lieut. Rodger, that an anchor, when 'dragged,' always tends to rise out of the ground, and does not again sink till it rests; in which case the force of penetration in the fluke must be estimated vertically, and then the most favourable position for the latter will be when its plane makes an angle of 45° with the shank.

With respect to the strength of an anchor, it may be observed that the strain of the cable has often broken the ring, on which account the thickness of the ring has been of late much increased. The force by which an arm in the ground is liable to be broken, is the reaction of the ground perpendicularly on the plane of the fluke, and this force varies with the length of a perpendicular let fall from the crown C on the direction of this reaction; it is therefore evident that, when the fluke makes a given angle with the shank, curved arms are preferable to those which are straight.

In lifting or weighing the anchor, the cable acting perpendicularly to the end of the shank tends to break it, and hence the thickness of the shank should increase with its distance from the ring; also the breadth of the shank should be downwards, and the like holds good of the arms, the chief dimension of which should be in the plane of the cable and shank, thus opposing the greatest strength to the greatest strain. The cable being 'up and down,' the smallest motion of the sea is carried to the anchor, and it is supposed that the chain-cable has thus, from its want of elasticity, frequently broken the anchor. An increased length of shank obviously renders this jerk less sudden and less severe; and in order to obtain this increase of length without either increase of weight or loss of strength, Lieut. Rodger constructed his patent hollow-shanked anchor. From some experiments which were made, it appears that an anchor of this kind withstood strains which broke short-shanked anchors of much greater weight.

Besides the strains to which an anchor is exposed by its office, it is liable to accidents; for instance, an anchor let go on a rocky bottom has been found, on heaving it up, to have lost an arm, which was probably caused by its striking against a rock obliquely in its descent; again, the shank has been found broken in the middle, though this does not seem to have been accounted for satisfactorily; and it may here be observed generally, that the anchor descends much more swiftly with a chain-cable than a hemp one, for the stiffness of the hemp opposes a retarding force, while the greater density of the chain adds a continually accelerating force.

An anchor is said to be 'foul' when the cable is in any way entangled with it; to 'come home' when the ship drags it; to be 'a-wash' when the stock is hove up to the surface of the water; and to be 'a-cock-bill' when hanging vertically.

An improved method of making anchors was introduced by Mr. Pering ('Treatise on the Anchor,' 1819), who formed the arms and part of the shank together by splitting, or dividing in two, the bars, and turning the ends back in contrary directions for the arms. Over the opening or angle thus formed he fixed a truss, to which he joined the flukes, and at the other end the remaining part of the shank. Lieut. Rodger formed

the upper and lower halves of the (solid) shank separately, and afterwards united them in order that the iron might bend rather than break; with this object, also, the iron was drawn out to make it fibrous.

The principal dimensions of the anchors in the navy may be stated shortly thus:—calling the shank 10, the arm is about 3; the breadth and depth of the palm about half this, the thickness or depth at *b*, or the small, ·42, at the throat ·6, which are nearly the dimensions of the arms also, and the breadths about ⅓ of these, the edges being rounded.

The weight of an anchor of 10 feet in length is, according to Mr. Pering, about 11·4 cwt., and since, if the forms of all anchors were alike, the weights would be as the cubes of the lengths, the weight of any anchor might be found by multiplying the cube of its length by ·0114. Thus, the weight of an anchor of 14 feet in length would be $14^3 \times \cdot0114 = 31\cdot3$ cwt.; the weight of this anchor is, by the table, 30 cwt., hence as far as 30 or 35 cwt., the rule is near enough, but for larger anchors it gives the result too small, because their thickness is made greater in proportion. The weight of the anchor includes that of the ring.

With respect to the relation between the weight of an anchor and the magnitude of the ship, a general rule in the navy is to allow 1 cwt. to a gun; thus, an 80 gun ship would have an anchor weighing 80 cwt. A merchant-ship of 200 tons having an anchor weighing 10 cwt., 5 cwt. are added for every additional 100 tons; thus, a ship of 800 tons would have an anchor of 15 cwt., and so on. Small vessels require heavier anchors in proportion than large vessels; the sea, sudden gusts of wind, and the pull of the cable, affect the larger vessels less, and they thus preserve a steadier strain.

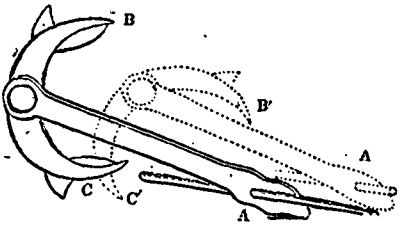
As to the cost of an anchor, the labour per cwt. is about 24*s.* for an anchor of 10 cwt. and under, and for the largest anchors about 3*l.*; the value of an anchor of 95 cwt., including the iron at about 9*s.* 9*d.* per cwt., is about 300*l.*

The stock consists of two beams of oak, bolted and hooped together; the length is that of the shank and half the diameter of the ring; it is square; the side at the middle is an inch to a foot of the shank, and tapers to half of this at the end. Such a stock is nearly one-fourth of the weight of the anchor. Lieutenant Rodger has proposed a solid stock of African oak, for the greater convenience of stocking or unstocking.

Of late years iron stocks, whose weight is from one-fourth to one-fifth of the anchor, have been much used. Whatever convenience may attend them in small vessels, it seems very clear that their smaller diameter and greater weight under water will cause them to sink deeper in a soft bottom, in the event of the anchor not turning over at once, and thus render this more difficult to do, especially as their length is limited to that of the shank.

In forging an anchor, care is taken not to render the iron brittle. The effect of the hammer is to harden the surface by contracting it more than the interior. This is remedied by heating the whole to a dark red-heat, which, by expansion, restores the iron to a uniform state, and it is then suffered to cool gradually. This process is called annealing.

Among the changes proposed in the construction of anchors, the most remarkable is, perhaps, that which was brought forward by Mr. Porter, for the purpose of avoiding the consequences of 'fouling,' by the cable passing over the exposed fluke of the anchor when the vessel is swinging in a tide-way, and injury to the vessel herself in the event of settling upon her anchor. The peculiarity consists in giving to the arms a freedom of motion round a pivot or bolt at the end of the shank. The arms and flukes are forged independently of the shank, and have a hole drilled transversely through the centre for the reception of the iron bolt which connects them with the shank. The effect of this construction is, that when the anchor, after being dropped, rests upon the ground, it has the position A B C, the lower



peak being in contact with the inferior surface of the shank, and the upper peak as far as possible from it. The slightest movement of the cable then suffices to bring the anchor to the position A′ B′ C′, when the lower peak is favourably situated for penetrating into the ground: the penetration then takes place, and at length the shank and stock lie flat on the ground, the upper fluke being close upon the top of the shank.

In 1836 Mr. Meggitt patented an anchor in which the flukes are very little broader than the arms; while at the same time there is an increased width given to the crown by the addition of a triangular piece of iron. The objects of these modifications in the customary form are stated to be three in number: 1st, that the peak of the anchor, not being encumbered by so broad a fluke as usual, may be able to penetrate more readily into the ground; 2ndly, that the increased breadth at the crown may give greater strength and resistance against the draught of the cable; 3rdly, that the 'fouling' of the cable may be less likely to occur, inasmuch as the cable, if twisted round the arm, might be able readily to slip off, by virtue of the narrowness of the fluke.

It is unnecessary to notice all the suggestions for the improvement of anchors, since these often involve points of very minor importance. We may however glance at an ingenious substitute for an anchor, which Commander Belcher used on board H.M.S. Ætna, and which affords a hint likely to be useful in emergencies. It was formed of three pigs of ballast, each weighing 56 pounds,

and a pair of moveable flukes. One of the pigs of ballast formed the upper part of the shank, and was connected with the cable; the other two pigs were jointed to the lower end of the first, and moved on a pin or swivel bolt; the arms were jointed to the lower end of these two pigs, by being placed between them, and bolted through the crown. The bolt passing through the crown was long enough at each end to form a sort of stock for the anchor.

The officer just named (Capt. Belcher) has also devised a mode ('Naut. Mag.' vol. ii.) of weighing anchors different from that customarily in use. An open boat, brought immediately over the anchor, is fitted in the following manner:—Across the broadest part of the boat is placed a strong spar, projecting at each end two feet beyond the boat, and so confined to the gunwales of the boat as to be capable of a rotation on its axis without further shifting. A gin, or pulley, is retained exactly beneath the keel by a rope proceeding from the starboard end of the spar, while a buoy-rope, proceeding from the larboard end, passes over this pulley, and so descends to the anchor. The effect of this arrangement is, that when once the anchor is lifted from the ground, it hangs exactly beneath the keel, and thus enables the full buoyant power of the boat to be brought fairly into play. The anchor is raised by causing the rotation of the spar, by the use of levers inserted in holes in the spar. Captain Belcher states that a boat will in this way nearly support her tonnage. The Ætna's cutters could each weigh a 10 cwt. anchor; and by a modification of the plan, in which two boats are employed instead of one, a cutter of 25 feet long and a jolly-boat of 18 weighed an anchor of 50 cwt.

There has been very recently introduced a new mode of adjusting the windlass for weighing the anchors of ships. In the usual arrangement there are holes in the windlass-beam for the reception of long levers, which are inserted in one hole after another as the beam turns round. But Mr. Kendall, in his 'elbow-jointed fall purchase,' adopts a mechanical action analogous to that exhibited in a common fire-engine. A strong block of wood is firmly fixed on the deck, near the windlass-beam, and on the top of this is a pivot, or fulcrum, for the centre of a transverse lever 16 or 20 feet long (for large ships). The men stand at either end of this lever, and work it alternately up and down, in the manner of a fire-engine. From each half of the lever descends a perpendicular rod, connected at the bottom with a curiously formed jointed lever; when the rod descends, this lever catches in one of the teeth of a ratchet-wheel connected with the windlass-beam; and when the rod rises, the lever forces the beam round a portion of one revolution. Every movement produces a portion of the resultant effect: for there are two vertical rods, two jointed levers, and two ratchet-wheels; and when one of the rods is depressed, it produces a partial rotation of the windlass; whereas when it is elevated, the other rod is so acted upon as to produce working effect. There is a third ratchet-wheel, at the middle of the windlass-beam, the teeth of which receive falls or detents intended to prevent the beam from rotating in the contrary direction. The objects held in view by this invention are—to render the performance of the windlass more certain and more rapid; to give an equal purchase with a smaller number of men than usual, or a greater purchase with an equal number of men; and to strengthen the hold of the windlass in any given position.

A'NCHORET, sometimes written, and more correctly, Anachoret, a Greek word, signifying a person who has retired from the world. Under Christianity anchorets sprung up about the middle of the third century in Egypt and Syria. Paul, commonly called the hermit, has the credit of having been the first regular anchoret. A distinction, however, came afterwards to be drawn between anchorets and hermits; the former name being given only to those who rigidly confined themselves to their caves or cells, and the latter to those who, although they had broken off all commerce with the world, still wandered about at large in the wilds to which they had retired. The most singular species of anchorets recorded in the history of the church, is that which arose in Syria in the fifth century, and of which Simeon Stylites was the founder. This zealot and his followers, instead of resorting, according to the customary fashion, to caves, elevated themselves into the air, on lofty pillars of stone, on the tops of which they passed their lives.

ANCHO'VY (*Engraulis Encrasicolus*, Flem.), a genus of abdominal malacopterygious fishes, characterized by the pointed form of the head, the upper jaw being the longest, the mouth deeply divided, with the gape extending beyond the line of the eyes. The branchial apertures are large; the ventral fins somewhat anterior to the line of the commencement of the dorsal fins; abdomen smooth; branchiostegous rays twelve.

The anchovy is abundant in the Mediterranean and along the coasts of Spain, Portugal, and France. It occurs also on various parts of our coast, as Hampshire, Cornwall, Wales, &c.

This fish generally measures from four to five inches in length, but Mr. Yarrell records the fact of specimens caught off Cornwall measuring seven inches and a half. It would appear that a fishing for anchovies might be there established, with a good prospect of success, for though but few are now captured, the meshes of the nets in ordinary use being too large, yet numbers are found in the stomachs of whiting and other ravenous fishes, proving their abundance.

The anchovy has been celebrated from the earliest times, and a sauce or condiment called garum prepared from it was held in high estimation among the Greeks and Romans.

In preparing this fish for use, the head and viscera are removed, otherwise the pickle would be intensely bitter; the anchovy was in fact once supposed to have the gall in its head. A fish called the *sardine*, common in the Mediterranean, and belonging to the same genus (*E. melette*, Cuv.) is frequently mixed with real anchovies, or even sold salted and barrelled as the genuine fish. The sardine may be known by its long taper form, its dark brown colour, and pale flabby flesh.

ANCHOVY PEAR. [GRIAS.]

ANCHU'SA, a genus of plants belonging to the natural order *Boraginaceæ*. Some of the species have been used in medicine, whilst others are employed in the arts for dyeing. Two are inhabitants of Great Britain.

A. officinalis, common Alkanet or Bugloss. When young is sometimes boiled and eaten. The roots contain a considerable quantity of gum, and when boiled yield a demulcent drink, which was once in repute as a medicine. In China, this plant is used as a provocative of the eruption of small-pox.

A. tinctoria, Dyers' Bugloss or Alkanet, is cultivated in the south of France for the sake of the root, which yields a fine red colour to oils, wax, and all unctuous substances, as well as to spirits of wine. Its chief use is in colouring lip-salves, ointments, &c. It is however sometimes employed for staining wood and dyeing cotton. It is also used for colouring many of the beverages sold under the name of port wine, likewise the corks used for the bottles in which this fluid is sold.

ANCHYLO'SIS, a Greek word (ἀγχύλωσις), signifying *a bending*. If the Greek orthography were strictly followed, the word would be written *ankylosis*.

It consists of the immoveable union of two bones naturally connected together in such a manner as to form a moveable joint. All the moveable bones forming joints may become consolidated together, or anchylosed; and cases are on record of a general anchylosis of all the bones of the human body. Whatever keeps a joint motionless for a long time together may give rise to anchylosis. Hence it is apt to occur after the fracture of a bone in the neighbourhood of a joint; because it is necessary to the cure of the fracture that the limb should be fixed in one position, while the inflammation, occasioned by the violence that produces the fracture, often spreads to the joint, and it is one of the ordinary effects of inflammation to agglutinate and consolidate the parts inflamed. Hence inflammation, sprains, dislocation, shocks occasioned by leaping or falling on the feet from great heights, and ulcers, are the common causes of anchylosis. But anchylosis cannot always be considered in the light of a disease; at any rate, it is sometimes the happy termination of a formidable malady. The natural cure of many painful and dangerous diseases of the joints is the formation of an anchylosis.

ANCIENT, ANCIENTS; or ANTIENT, ANTIENTS. The term *ancient*, which we derive from the French word *ancien* and remotely from the Latin *antiquus*, has the primary meaning of 'very old,' as when we say 'an ancient building,' 'an ancient family.' But it is also used in a more limited sense, with reference to a certain period in the existence of the human race; as when we speak of ancient history, as distinguished from modern; of the ancient classics, ancient literature, and generally, of the *ancients*. The boundary line between ancient and modern in this latter sense is not very accurately drawn; but according to the vulgar acceptation of the terms, the period of the ancients seems to be closed by the overthrow of the western Roman empire. With reference to the nations over which that empire extended, the distinction is not altogether arbitrary, or without reason. The overthrow of the Roman empire in the West marks the commencement of a new order of things, when we begin to discover the rudiments of those independent nations, of those various languages, and peculiar institutions, which so remarkably distinguish a large portion of what is called modern Europe from Europe under Roman dominion. There is of course a short interval, which may be considered as doubtful ground, for the possession of which the terms ancient and modern will always be allowed to contend.

The convenience of having such terms as ancient and modern has often led to abuse, and this is particularly observable in the vague reference so frequently made to 'the ancients.' There is no definition which excludes from their number any who lived from the time of Noah down to the last Roman emperor; and it is obvious that there is not much which can be truly said of a class so large and comprehensive, yet we often hear of what 'the ancients' said, and did, and thought. Allusion is made to the military tactics or the philosophy of the ancients; comparisons are instituted between the literature of the ancients and moderns; and we are told of the sentiments on certain subjects entertained by the heathen ancients. But by 'the ancients' we must understand, on many occasions, Greeks or Romans at certain periods of their national history; and even thus limited, there are few assertions which will hold good of 'the ancients' generally. For the most part, perhaps, the looseness of the expression is corrected by the subject or the context; but real misapprehension has arisen from the practice of confounding the most dissimilar things under this comprehensive term. The common division of history into two parts, ancient and modern, often conveys the notion of an actual separation which does not exist. The truth is, the history of human civilization is one history, and the subjects of what are called ancient and modern history are so far indivisible, that a liberal and comprehensive view of the ancient part is necessary for the profitable study of the modern.

ANCIENT DEMESNE. [MANOR; SOCCAGE.]

ANCIENT LIGHTS. [LIGHTS.]

ANCILLA or ANCILLA'RIA, the names given by Lamarck to a genus of spiral, univalve, marine shells, allied to the *olives*. Like them they are covered with a hard shining coat, destitute of any periostraca, and it is immured in the large foot of the animal, so that the middle of the back of the shell can be alone discovered. They chiefly differ from the *olives* in the suture of the whorl being callous and not furnished with a groove formed by a thread-like filament placed at the end of the mantle, which is wanting in this genus: they are also furnished with a small ovate operculum. The species are numerous, and are chiefly confined to tropical climates.

ANCILLON, DAVID, a very learned French Protestant clergyman, was born on the 17th of

March, 1617, at Metz, where his father was an eminent lawyer. Having attended for some years the Jesuits' College there, he went to Geneva, in 1633, to complete his studies; and in 1641 was licensed to preach by the synod of Charenton, and appointed minister at Meaux. In 1653 he accepted a call to his native town of Metz; and here he continued to officiate with great reputation till the revocation of the Edict of Nantes, in 1685, when he retired to Francfort. He afterwards went to Berlin, where he was received with great favour by the Elector of Brandenburg, and continued to reside there till his death, in 1692. He is the author of several works, principally in defence of the reformed faith. Perhaps, however, the most favourable impression of his varied learning is to be obtained from the work entitled 'Mélange Critique de Littérature recueilli des Conversations de feu M. Ancillon,' published at Basle, in 1698, in two volumes 12mo., by his son Charles, who was one of the most learned lawyers of his time.

ANCLIFFE, or ANCLIFF, a hamlet near the town of Wigan in Lancashire, where was formerly a singular well, called by the inhabitants the 'burning well.' The true cause of the phenomenon appears to have been the escape of carburetted hydrogen gas from the earth at the bottom of the well, which, passing rapidly through the water, gave it the appearance of boiling, and took fire if a lighted candle was applied to the surface. The well, or its peculiar property, is now lost. (*Beauties of Eng. and Wales.*)

ANCONA, a seaport town in the Papal States, on the Adriatic Sea, in 43° 38′ N. lat., 13° 35′ E. long. It is the capital of the delegation of Ancona, and the seat of the court of appeal for the delegations of Urbin-e-Pesaro, Macerata, Camerino, Fermo, Ascoli, and Ancona. The town is built on the slope of a natural amphitheatre which lies between two promontories. It is the most commercial place in the Papal States, carries on a considerable trade by sea, and is a free port. Its harbour, which is good, is protected by two moles, the ancient one raised by Trajan, and the modern one with the light-house constructed by Clement XII. On the ancient mole stands a fine triumphal arch dedicated to Trajan. The arch, which is built in the Corinthian style and of Parian marble, has only one gateway, and is ornamented with four columns on each front. The streets of the town are narrow and gloomy, except one fine street, which Pius VI. opened, leading to the mole. The citadel, built on a hill, commands the town and harbour, but is itself commanded by the neighbouring heights. The cathedral is a very old structure, built outside the town, on the site of the former temple of Venus. The other remarkable buildings are the town-hall, the merchant's-hall, the arsenal, the lazzaretto, built by Vanvitelli, and the churches of the Dominicans and the Augustins.

The situation of Ancona is pleasant and healthy, the country around is very fertile, and the women are reckoned among the handsomest in Italy. The population, according to the latest accounts, is 35,271. Ancona exports wax, silk, wool, and corn. It is the only good harbour on the Italian coast of the Adriatic between Venice and Manfredonia, and is the common point of departure for the Ionian Islands and Greece.

Ancona is said by Strabo (p. 241, Casaub.) and Pliny to have been built by some Syracusans who fled from the tyranny of Dionysius. Juvenal calls it a Doric colony; it is probably older than the date assigned to it by Strabo. The name of *Ancon* (ἀγκὼν) means an elbow, such being the shape of the neck of land on which it is built. The Romans made it one of their principal naval stations on the Adriatic. In the middle ages, it governed itself as a republic under the protection of the popes, until 1532, when Clement VII. made himself absolute master of the town. The French occupied it in 1797, and it was retaken by the Austrians in 1799, after a long siege. The French took possession of the citadel again in 1832, and did not evacuate it till 1838.

ANCRE, MARÉCHAL and MARQUIS D'. To this high military rank and title was raised a poor and obscure Florentine gentleman of the name of Concini dei Concini, son of a notary. He came to Paris in the suite of Maria de' Medici, whom Henri IV. of France espoused after he had repudiated Marguerite de Valois. Concini soon after his arrival married Eleonora Galigai, one of the queen's women of the chamber. Both were ambitious, persevering, and endowed with those abilities which, at that time, ensured success at court. On Maria de' Medici becoming regent after the assassination of Henri IV., the elevation of Concini was extremely rapid. But his sudden elevation, and rapid accumulation of immense wealth, together with his insolence to the young king and his overbearing manner to the nobles, were the cause of that hatred which brought him to a dreadful end. A young man, at length, of the name of Luynes (known afterwards as Duc de Luynes), who was in great favour with the young king, persuaded him to deliver the queen-mother from the power of her favourite, and urged his insolent bearing to the nobility, and his pernicious influence, with so much success, that at last Louis XIII. ordered the Maréchal to be arrested, and even to be put to death if he resisted. Vitry, a captain of the king's guard, was entrusted with this commission, which he executed to its fullest extent. D'Ancre was shot dead as he was entering the palace of the Louvre. The body of the murdered man was first secretly buried at St. Germain l'Auxerrois, but was soon after torn from the tomb by the infuriated mob, who dragged it through the streets on hurdles and then threw it into the highway. Eleonora soon shared the misfortunes of her husband. She was accused and convicted of sorcery, Judaism, and corruption; and was executed at the Place de Grève, on the 8th of July, 1617. During her trial, and at the moment of her execution, she displayed the greatest firmness of mind, saying, the only sorcery she had used towards the queen 'was the power of a strong mind over a weak one.'

ANCUS MARCIUS, the fourth king of Rome. To Ancus Marcius tradition assigned the honour of laying the first foundation of the *plebes*, or commonalty, that important element in the state to

which Rome, under the commonwealth, owed nearly all her greatness. His predecessor, Tullus Hostilius, attentive solely to war, had neglected the religious institutions established by Numa. Ancus Marcius, whose mother was the daughter of Numa, restored the neglected rites, and endeavoured to imitate the pacific policy of his grandfather. But the neighbouring states, mistaking his love of peace for timidity, provoked him to hostilities by aggressions on the Roman territory. In the successive wars with the Latins, the Veientines, and other states, which ensued, he was invariably successful. From the Latins he took the towns Politorium, Tellenæ, Ficana, Medullia, and transferred their inhabitants to his capital, giving them, as a place of abode, a part of the Aventine and the valley near the temple of Venus Murtia which separated that hill from the Palatine. These Latin towns are supposed to have been situated between Rome and the coast; and indeed the conquests of the king extended to the mouth of the Tiber, where he established the colony of Ostia. In his war against Veii he was equally successful; and to protect his people on that side he fortified the Janiculum, and connected it with the city by means of the Sacred Bridge called the Pons Sublicius, in the construction of which no brass or iron was used. This bridge lasted until 23 B.C., when it was carried away by an inundation of the Tiber, and its place was supplied the following year by a stone bridge erected by the censor Æmilius Lepidus. A still more durable monument connected with the name of Ancus is the prison formed out of a quarry in that side of the Capitoline hill which overlooks the Forum. Ancus reigned twenty-three or twenty-four years. The plebeian family of the Marcii vainly endeavoured to refer their origin to this king. (Livy, i. 32—35; Dionysius, iii. 36—45; Niebuhr's *Roman History*, translated by Hare and Thirlwall, vol. i. p. 346—350.)

ANCYLO'CERAS (D'Orb.). This fossil genus of M. D'Orbigny includes several species of Hamites (Phillips), from the Speeton clay and lower greensand.

A'NCYLUS, a genus of little fresh-water snails, covered with a shell much like that of a limpet, but more compressed, and with the apex placed more backwards. Like the marine limpets with which they have been associated by some naturalists, they are found adhering to stones and leaves in fresh-water springs and streams, and creep with a slow motion. In the mollusk, the head is distinct, the mouth large, the tentacles two and retractile, with the eyes at their outer base; the branchiæ are in a sort of cavity in the middle of the left side, between the foot and mantle; the animal being, as Rang considers, sinistrorsal. Habitat, Europe, America, and the West Indies.

ANCY'RA, now *Angora*, or *Engour*, was a large city of Asia Minor, in 39° 56′ N. lat., 32° 50′ E. long. Tradition ascribed its origin to Midas, and its inhabitants exhibited in a temple of Jupiter a sacred anchor, which was said to have been discovered at the time of its foundation. This was probably a Greek invention, to account for the name of the city: an anchor (in Greek, *ankýra*) appears on the coins struck in the reigns of the Antonini, Sevérus, and Caracalla. When the Galli or Gálatæ established themselves in Asia Minor, Ancyra became the capital of a tribe which had originally come from the neighbourhood of Toulouse, called Tectósages. In B.C. 189, the whole of Galatia was subdued by the Roman general, Manlius, and it became virtually dependent upon Rome. Towards the close of the republic, Deiótarus, who was only tetrarch of the Tectósages, had extended his authority over the other Galatian tribes, and assumed the title of king: but under Augustus (B.C. 25) the whole country was reduced to the form of a province, of which Ancyra was still the capital. Though deprived of its nominal independence, the city flourished under the favour of Augustus. The city was permitted to assume the name *Sebaste* (the Greek term corresponding to the Latin *Augusta*), and at the death of the emperor, when an inscription on bronze was erected at Rome to commemorate his achievements, the citizens of Ancyra procured a copy, and had it inscribed on marble in Greek and Latin, on a temple dedicated to Augustus and Rome. This inscription, called the *Monumentum Ancyranum*, was discovered, in 1554, by Wrantz, bishop of Agria, and ambassador from Ferdinand II., at the Ottoman Porte. A more correct copy was taken by Tournefort in 1701, and by him communicated to Chishull, who supplied many of the lost words by conjecture, and published it in his 'Asiatic Antiquities.' It has been repeatedly printed since, particularly as an appendix to the writings of Tacitus. (Oberlin's edition, tom. ii. p. 586.) The latest copy that has been made of the Latin inscription is by Mr. Hamilton, who also copied so much of the Greek translation as is legible ('Appendix,' No. 103). Suetonius ('Augustus,' c. 101) speaks of the original inscription at Rome, from which the Monumentum Ancyranum was copied. The importance of Ancyra under the empire is proved by its numerous coins, and by the number of its public buildings, and the inscriptions found in all parts of the town. It was the seat of one of the earliest Christian churches; and in the years 314 and 358 Christian councils were held there. Pagan worship, however, had not yet ceased when the Emperor Julian visited Ancyra in 362. As the power of Rome declined, the frontiers were exposed to the ravages of various enemies. In 625 Ancyra was taken by a general of the Persian Chosroes. In 1085 it was taken by the Turks, but in 1102 recovered for a time by the Franks. After being for some time the capital of the Turkish empire, it was taken by Tamerlane, after his defeating Bajazet in a great battle near Ancyra, July 28, 1402. In 1415 it was recovered for the Turks by Mohammed I., and since that time has belonged to the Ottoman empire. The population is probably 50,000 or 60,000. It had once a large trade in the silky wool or hair of the Angora goat, but this trade has much diminished of late years, owing to the government prohibiting the Armenian population from keeping the goats. Angora is the principal residence of the Catholic Armenians in the Turk-

ish empire. (Tournefort, *Voyage du Levant*, tom. ii. p. 244; *Mémoires de l'Académie des Inscriptions*, tom. xxxix. p. 391; Rasche, *Lexicon Rei Nummariæ*, article *Ancyra*; Hamilton, *Researches in Asia Minor*, &c.) There was another Ancyra in Phrygia Epictétus, the precise position of which is unknown. The coins of both towns have the name in the form ANKTPA, not ΑΓΚΤΡΑ.

ANDALUCI'A or ANDALUSI'A, the most southern of the provinces of Spain, comprises the former Moorish kingdoms of Seville, Cordoba, Jaen, and Granada. It is situated between 36° 4′ and 38° 25′ N. lat., and 1° 44′ and 7° 20′ W. long.; is bounded on the N. by La Mancha and Estremadura, on the E. by Murcia, on the S.E. by the Mediterranean, and on the W. by Portugal. It extends, in its greatest length, 300 miles from E. to W., and its average breadth from N. to S. is 98 miles. Two chains of mountains traverse this province, the Pœno-Bætic range, and the Marianic range. The Pœno-Bætic range extends from Tarifa to Cape Gata, a distance of about 240 miles in length; its breadth, from the Sierra de Bedmar to Cape Sacratif, is from 75 to 80 miles. The direction of this chain is first from south to north, and then from east to west: in its course it takes different names; such as the Sierras (mountains) of Gazales, Ronda, Abdalazis, Prieta, Loja, Alhama, Tajada, Lujar, Nevada, Filabres, Aljamilla, Gador, and Contraviesa. Many mountains of this range are covered with perpetual snow. The Mulhacen is 11,660 feet high; and the Picacho de Veleta, 11,385 feet, affords one of the most magnificent panoramic views in Europe. The other great range, the Marianic, lies farther north. The length of this chain from Cape St. Vincent to the Sierra Segura, in Murcia, including the mountains of the Algarves, is about 360 miles, and its greatest breadth between Cordoba and the river Guadalmez nearly 60. Its various names in different parts are the Sierras of Pedroches, Cordoba, Constantina, Guadalcanal, Monasterio, Albalcira, Aroche, Caldeirão, Monchique, and Morena. The Sierra Morena contains the richest deposit of minerals in Spain: it produces mercury, lead, copper, silver, and gold: it is also exceedingly abundant in pasture, and well adapted to cultivation. The high road from Madrid to Andalucia cuts this chain in its narrowest and most elevated part, called Despeña Perros, or the Precipice of the Dogs. The two ranges are often called respectively the Sierra Nevada and the Sierra Morena, the Snowy Mountains and the Dark Mountains.

The Guadalquivir is the largest river in Andalucia. It rises in the eastern part of the province, and drains nearly the whole of the district between the two ranges of mountains; it receives the waters of the rivers Guadiana, Menor, Guadajoz, Genil, &c., passing near Jaen, Cordoba, and Seville. Its course is about 350 miles, and it is navigable below Seville. The rivers south of the Pœno-Bætic mountains are all small.

The plains of Andalucia, notwithstanding their being situated in one of the warmest climates of Europe, are still, generally speaking, of a moderate temperature. On the northern side of the Sierra Morena the productions indicate a climate like that of the south of France; but southward of that range are found the mastic tree, the kermes oak, myrtles, American aloes, palm-trees, the olive, the banana, the caper, orange and lemon trees, the pomegranate, and other productions of warm climates; and in some spots the sugar cane and cotton grow. The orange and lemon trees, particularly around convents and monasteries, form groves of considerable extent, which in the time of blossoming fill the air with a delicious perfume. At that season the inhaling of so many odours, in which the balsamic perfume of the cistus is distinctly perceived, especially before and after sunset, gives a delightful sensation of the salubrity of the air. The soil is so productive, particularly in the plains, that the husbandman with very little trouble may obtain an abundant harvest. Besides all the species of corn and fruit, wine and oil make the bulk of the productions of the soil. Among the wines, the Xerez (or sherry), the Pajarete, Malaga, Montilla, Espera, Bornos, and Tintilla, are the most celebrated.

The rich pastures of the mountains and valleys feed innumerable herds of cattle, among which the bulls have been renowned from the fabulous times of King Geryon. The woods of oak of the Serrania de Ronda, of Cordoba, and Granada, afford nourishment to a multitude of hogs; and the Loma de Ubeda, the Dehesa of Cordoba, and the Cartuja de Xerez, produce the finest breed of horses in the peninsula. The seas and rivers abound in fish, and the mountains in every species of game. The wolf and the boar are the only ferocious animals; among the reptiles and insects, the scorpion, the tarantula spider, the chameleon, and some snakes, though none of the worst kind are found. The riches of the mineral kingdom are no less abundant. Sixty-six mines are known, which produce gold, silver, copper, iron, lead, loadstone, coals, vitriol, and sulphur.

By a royal decree dated Nov. 30, 1833, the former kingdom of Andalucia was divided, for purposes of administration, into two departments, Granada and Andalucia, each of which is governed by a captain-general, and subdivided into provinces, which are named from the chief town in each. Granada contains three provinces, Granada, Almeria, and Malaga; the high civil and criminal court of the province called 'Chancilleria Real,' in which the captain-general presides, is held in the city of Granada. Andalucia contains five provinces, Seville, Huelva, Cadiz, Cordova, and Jaen; the high civil and criminal court, called 'Audiencia Real,' of which the captain-general is chief judge, is held in the city of Seville.

The people of Andalucia appear to be a mixture of five different nations, which successively have had the dominion of that region,—the Carthaginians, the Romans, the Vandals, and the Goths, mixed with the original race, very probably of African origin. The Moors invaded it in 711, and it was not until 1491 that they were expelled from Granada, their last hold. Notwithstanding their expulsion, many traces of their

character are still discernible. The complexion and features of the inhabitants, their dances, music, and musical instruments, many names of persons and places, the most trivial phrases, their prejudices, their system of agriculture, their hospitality, and part of the dress, especially among the women of some villages, and even their harsh mode of aspirating the Castilian language,—everything reminds the attentive observer of their Arabian ancestors. The Andalucian, inhabiting one of the finest climates in the world, where nature so liberally yields its riches, is rather indolent in character—at least in the plains; but in the hilly districts the inhabitants labour like other mountaineers. The Andalucian women are remarkable for the gracefulness of their forms, for their expressive, large, and black eyes, and for their small delicate feet.

Though there are universities at Seville, Granada, and Cordoba, besides several colleges at Cadiz and other principal towns, education is not in the most flourishing condition. The unequal division of the land,—the best and largest portion of which is in the hands of the grandees, who never visit their possessions, and care little about improving them,—keeps agriculture in a very backward state; and an oppressive and injudicious fiscal system prevents the advancement of trade and industry.

(Miñano; Antillon; Malte Brun; Bory de St. Vincent; Inglis, *Spain in* 1830; Ford, *Handbook for Spain.*)

ANDALUSITE occurs crystallized. Primary form a right rhombic prism. Fracture uneven, conchoidal. Colour flesh-red to brownish and greyish red. Hardness 7.5. Lustre vitreous, transparent to opaque. Specific gravity 3.104. Found in France, Spain, and North America. Analysis of a specimen from America:—Silica, 39.09; alumina, 58.56; protoxide of manganese, 0.53; lime, 0.21; water, 0.99.

ANDAMAN ISLANDS, a group in the Bay of Bengal, consisting of four islands with several islets, in 92° 30′ E. longitude, and occupying a space which extends from 10° 32′ to 13° 40′ N. latitude. Three of these islands are so contiguous, being only separated by very narrow straits, that they are usually considered as one island, under the name of the Great Andaman, and are generally so laid down in maps.

Great Andaman is about 140 miles long and 20 miles broad. In the centre is a high mountain called the Saddle Peak, which is about 2,400 feet above the level of the sea. The island does not contain any considerable river. It is tolerably clothed with trees, several of which afford timber of sufficient size for ship-building; among them are the poplar, ebony, a tree resembling satin-wood, red-wood, the cotton-tree, and almond-tree, besides bamboos, ground-rattans, and numerous shrubs. The other vegetable productions are not numerous. The animals found in the islands are the hog, the rat, and a few others; while fish abound on the shores.

The inhabitants are among the very lowest in the scale of civilization of any people with which we are acquainted. They are small of stature, seldom exceeding five feet in height, and ill-formed, with large heads and very slender limbs. In colour, hair, and features, they resemble the race of African negroes. They are wholly unaccustomed to the use of clothing, and their implements, weapons, and dwellings, are of the rudest possible description. In their disposition they are described as cunning and treacherous; their disinclination to the intercourse of strangers amounts with them to a passion. They make no attempt to cultivate the soil, and are obliged to reside in the immediate neighbourhood of the sea, from which they derive the principal part of their food. The origin of a race so very different from all their neighbours has never yet been satisfactorily determined.

A settlement was attempted by the English in 1791, on the south part of the largest island; which settlement was, two years afterwards, removed to Port Cornwallis, near the northern end, in 13° 28′ N. lat., and 92° 54′ E. long.; but it was abandoned in 1796, on account of the unhealthiness of the climate. In 1824 the British force under Sir Archibald Campbell, despatched against the Burmese, assembled in the harbour, where some of the ships remained about a month; but it was not found possible on that occasion to establish any intercourse with the natives, who omitted no opportunity of showing their hostile feelings by discharging their arrows at all the Europeans who came within their reach. Another visit was made in 1825, when the inhabitants showed an equally fierce disposition, and endeavoured as much as possible to obstruct our people while filling their water-casks.

(Symes's *Embassy to Ava;* Hamilton's *East India Gazetteer.*)

ANDAN'TE, in music, is the third in order of the five classes into which musical movement is divided, and the medium between the extremes of slow and quick. It indicates a steady calm movement, and strict equality in the measure of each bar.

ANDANTI'NO, in music, the diminutive of *andante,* has been interpreted differently at different times; but it now means a movement quicker than *andante,* but slower than *allegretto.*

ANDELYS, LES. [EURE.]

ANDERNACH, a small town on the west bank of the Rhine, in the district of Coblenz, in the Prussian Rhine-Province, 50° 27′ N. lat., 7° 25′ E. long., and about 10 miles W.N.W. from Coblenz. It has some trade, chiefly in millstones, which are cut in the neighbouring villages of Ober-Mendig and Nieder-Mendig, in bricks, clay for tobacco pipes, and in trass, which is sent to Holland. This trass is an indurated volcanic mud, of which a vast quantity is accumulated in the valley of Brohl, five miles north of Andernach. It is extensively quarried, and when pulverized and mixed with lime makes a mortar suitable for constructions under water. Trass is a corruption of the Dutch word *tiras,* which signifies cement. In Andernach numerous pieces of columnar basalt are employed as posts at the corners of streets, &c. The door-posts and side-pieces of almost all

the windows are made of the porous lava of which the famous millstones are formed. This material is also used for paving courts and kitchen floors, and has been employed in the construction of some of the oldest buildings in this town as well as in Coblenz. There are several mineral sources near the town. The place has about 3,000 inhabitants, and a gymnasium. The vine is cultivated in the neighbourhood. The whole district in which Andernach stands has been at some very remote period the seat of many active volcanoes, and is very interesting to geologists. There is a short account of this volcanic region in Dr. Daubeny's work on 'Volcanoes;' but the best description of it that we have seen is in the German Geographical Journal 'Hertha,' for the year 1828.

Andernach was a Roman station under the name of Antunnácum. It was also once an imperial town, till the year 1496, when the Elector of Cologne reduced it to the rank of a municipal town.

ANDERSON, SIR EDMUND, an able and learned judge in the reign of Queen Elizabeth, was also one of the most rigid of the high prerogative lawyers of that time. He was chief justice of the Common Pleas from 1582 to his death in 1605.

ANDERSON, ALEXANDER, a native of Aberdeen, in Scotland, who in the beginning of the seventeenth century, while yet a young man, appears to have settled as a private teacher of the mathematics in Paris. Neither the year of his birth, nor that of his death, is known. He is the author of the following works: 'Supplementum Apollonii Redivivi,' 4to., Paris, 1612; 'Ἀπτωλογία, pro Zetetico Apolloniani Problematis a se jampridem edito in Supplemento Apollonii Redivivi,' 4to., Paris, 1615; 'Ad Angularium Sectionum Analyticen Theoremata Καθολικώτερα, a Francisco Vieta Fontenæensi primum excogitata, at absque ulla Demonstratione ad nos transmissa, jam tandem Demonstrationibus confirmata,' 4to., Paris, 1615; 'Vindiciæ Archimedis,' 4to., 1616; 'Exercitationum Mathematicarum Dicas Prima,' 4to., Paris, 1619. All these works are very scarce. Anderson also appears to have been selected by the executors of Vieta, who died in 1603, to superintend the publication of his unprinted manuscripts. Two treatises of Vieta, accordingly, entitled 'De Æquationum Recognitione et Emendatione,' appeared at Paris, in 4to., 1615, with a dedication, preface, and appendix, by Anderson.

ANDERSON, ADAM, was born in Scotland in 1692. Having come to London, he obtained the situation of clerk in the South Sea House, with which establishment he continued to be connected for forty years. He died in 1765. The chief occupation of many years of Mr. Anderson's life was the composition of his voluminous work, the 'Historical and Chronological Deduction of Trade and Commerce.' In many of his opinions upon commercial subjects he was in advance of his age.

ANDERSON, JOHN, the founder of the Andersonian Institution of Glasgow, and one of the earliest promoters of that popular instruction in science which has so greatly elevated the character of British artisans, was born in the parish of Roseneath, Dumbartonshire, in 1726. He was left an orphan at an early age, and was educated at Stirling by an aunt. He received the more advanced branches of his education in the university of Glasgow; and in 1756 he was appointed professor of oriental languages there, but in 1760 was removed to the chair of natural philosophy. Not content with the ordinary duty of lecturing, he employed himself indefatigably in studying and exemplifying the applications of science to the useful arts, visiting for this purpose the workshops of intelligent artisans, and exchanging his scientific information for their experimental knowledge. The better to carry out his views of popular education, Anderson commenced, in addition to his ordinary class, one which he styled his *anti-toga* class, for the instruction of artisans and others unable to enter upon a regular academical course, to whom he delivered familiar extempore lectures illustrated by experiments. Mechanics were allowed to attend these lectures in their working-dress.

Anderson closed his useful career on the 13th of January, 1796, in the seventieth year of his age, after a connection with the university of upwards of forty years. Shortly before his death he devised his whole property to eighty-one trustees, for the establishment in Glasgow of an institution to be denominated Anderson's University, for the continued provision of those facilities for the unacademical classes of his townsmen which he had so long supplied by his own personal exertions. His comprehensive design was for an institution consisting of four colleges, with nine professors each, for arts, medicine, law, and theology; but as the funds proved insufficient for so extensive a scheme, operations were commenced in 1797, on a limited scale, by the appointment of Dr. Thomas Garnett as professor of natural philosophy. His first course of lectures was attended by nearly a thousand persons, of both sexes. In the following year a professor of mathematics and geography was appointed; and, though the institution has never attained the magnitude contemplated by the founder, it has been progressively increased and extended in usefulness, and has been productive of much public benefit. Dr. Garnett was succeeded in 1799 by Dr. Birkbeck, on occasion of his removal to the Royal Institution in London, which was formed on a similar model to that established by Anderson; and Dr. Birkbeck, who introduced a new course of instruction for five hundred operative mechanics, free of all expense, was succeeded in 1804 by Dr. Ure.

(*Glasgow Mechanics' Magazine*, vol. iii.; Chambers's *Biographical Dictionary of Eminent Scotsmen.*)

ANDERSON, JAMES, LL.D., was born in 1739, at the village of Hermiston, near Edinburgh, where his forefathers had been farmers for several generations. He very early showed a great love of reading, and having, in consequence of the loss of both his parents, taken the management of the family farm into his own hands at the age of fif-

teen, he soon after began to apply himself to the study of chemistry, with the view of availing himself of that science in his agricultural pursuits. His adoption of various improvements in husbandry, which had never before been introduced into the district where he lived, afforded other evidences of his superior intelligence. In 1763 he left his native place, and settled in Aberdeenshire, on a farm called Monkshill, consisting of 1300 acres of land almost wholly in a wild state. It was while residing here that he made his first attempt as a public writer in a series of essays on Planting, which he contributed, in 1771, to the 'Edinburgh Weekly Magazine,' under the signature of Agricola. These essays he collected and published together in 1777. From this time both his communications to periodical works and his separate publications were very frequent. In 1780 the degree of Doctor of Laws was bestowed upon him by the university of Aberdeen. In 1791 he commenced the publication of a periodical miscellany under the name of the 'Bee,' which had great success. In 1797 Dr. Anderson came to take up his residence in the neighbourhood of London; and in April, 1799, he established here a new periodical under the title of 'Recreations in Agriculture.' It was continued till March, 1802, when it ceased with the completion of the sixth volume. Dr. Anderson died on the 15th of October, 1808, having been for some years before much broken down through the effects of the intense literary labour of many years. There can be no question that to the zeal and labours of Dr. Anderson, much more than to any other individual, is owing the greatly increased attention to the subject of agriculture which, in Scotland especially, has grown up since he began to write. In this way he has been a distinguished benefactor to his country.

ANDERSONIAN INSTITUTION. [GLASGOW.]

ANDES, the general name given to the great range of mountains which runs along the western side of the continent of South America, and which is called by the Spaniards the *Cordilleras*, or chains of the Andes. We may fix the southern extremity of the Andes in the rocky islands of Diego Ramirez, off Cape Horn, in 56° 30′ S. lat., and their northern termination at the Isthmus of Darien. The Andes, although, in our maps, they look like one long single ridge, are by no means so, but are composed of a series of chains of mountains, more or less parallel, inclosing vast elevated plains, or table-lands, and of several great groups, like knots or articulations, at distant intervals. For the convenience of description, we shall divide the range of the Andes into four parts, marked by the political divisions of the continent, and shall call them the Andes of Patagonia, of Chili, of Peru, and of Colombia.

The *Andes of Patagonia* extend from 56° to 42° S. lat., or about 970 miles. Cape Horn, which may be seen distinctly at sixty miles' distance, is estimated to be about 3000 feet high. The greatest heights in Tierra del Fuego lie about the centre of the Strait of Magalhaens; and some of these reach nearly 7000 feet in height; but the average of the whole range is about 3000 feet. South of 40° S. lat. the Andes, instead of leaving a belt of land between their base and the sea, press close on the ocean, and thus assume a new character which they retain to the very extremity of the continent. North of 40° we find a long unbroken shore, affording neither shelter for vessels nor landing for boats. The whole of the regions around Tierra del Fuego, the Strait of Magalhaens, and Cape Horn, are very rugged and inhospitable; but the Andes do not present such a lofty and grand appearance as farther north.

The *Andes of Chili* lie between 42° and 24° S. lat., an extent of about 1200 miles. No accurate measurements have been made of the loftier summits, and all we know on this subject is very vague. Some are supposed to reach the height of 17,000 feet. There are several passes across the ridge, the most important of which are those on the great line of road between the city of Buenos Ayres and the port of Valparaiso on the Pacific. These mountain-passes lie between the city of Mendoza in the eastern plain, and Santiago, the capital of Chili. From Mendoza, which is 4486 English feet above the level of the sea, to La Cumbre (that is, the summit), the road ascends to the height of 12,700 feet, and from thence there is a gradual descent to the city of Santiago, which is 2614 feet above the Pacific.

Between 33° and 24° S. lat. two great mountain-chains form as it were buttresses on the eastern side of the range. The one, called the Sierra de Cordova, lies between 33° and 31°, advancing like a promontory into the pampas, or plains, east of the Andes; the other, called the Sierra de Salta, which has a general direction parallel to the other, lies between 28° and 24°, and extends 400 miles eastward. In the Chilian Andes the steep face is on the eastern side, to which there is not a progressive ascent, as on the western side from the Pacific. The breadth of the Andes in this part of their course is very various; the broadest part is between Mendoza and Santiago, and it is probably not less than 140 miles.

The *Andes of Peru* comprehend that part of the range between 24° and 6° S. lat., a space of about 1250 miles. Their southern extremity is situated in the modern republic of Bolivia, which includes the ancient provinces of Upper Peru. This portion has a general N.W. direction. Near Potosi (about 20° S. lat.) the range separates into two great branches, now called the Eastern and Western Cordilleras of Bolivia. The two branches meet again at about 15° S. lat., after enclosing a vast table-land. The eastern branch contains the loftiest mountains of the Andes, among which are the Cerro Nevada de Illimani, eastward of the city of La Paz, 24,350 feet above the level of the sea, and the Cerro Nevada de Sorata, 25,250 feet. The table-land included between the two branches has an elevation of 12,700 feet above the sea, containing an area of 3500 square leagues, covered with fruitful fields and populous towns. It contains the great Lake of Titicaca, the surface of which extends over 448 square leagues, and, according to Humboldt, is more than twenty times

as large as the Lake of Geneva. This table land or basin is enclosed on every side, and there being no outlet, the waters which flow down from the surrounding mountains into the lake must be carried off solely by evaporation from its widely-extended surface.

From this portion of the Andes springs a lateral branch, the Sierra Nevada de Cochabamba, which runs far to the east and divides some of the affluents of the Amazon from some of those of the Plata.

The table-land terminates on the north at the group of Cuzco, a vast assemblage of mountains, having an extent of surface three times as large as the whole of Switzerland, and with a mean height of 8300 feet. Proceeding N. W. from this group, a second bifurcation of the range takes place, enclosing another table-land, 11,000 feet high. This terminates in the group of Pasco; northward of which the Andes separate into three parallel chains, again uniting at the group of Loxa, about 5° S. lat.

The *Andes of Columbia.*—At the northern limit of the group of Loxa the main range divides into two subordinate chains, which inclose the longitudinal valley of Cuença by their uniting in 2° 27′ S. lat., to form the group of Assuay, which last contains a table-land at an elevation of 15,520 feet, almost within the region of perpetual snow. To the north of this group another bifurcation takes place, the eastern cordillera containing the great mountains of Chimborazo (21,415 feet) and Yliniza (17,386); the western cordillera containing the mountains of Sangay and of Cotopaxi (18,858). The chains unite in the narrow ridge of Chisinche for a short distance, but spread out again shortly afterwards to form the vast table-land of Quito, which is bounded by stupendous mountains on the east side, and is inclosed by the reunion of the chains at the volcano of Imbabura, in 0° 20′ N. lat., near Villa de Ibarra. In the eastern cordillera are the mountains of Antisana (19,126 feet) and Cayambe (19,625); in the western, are Pichincha (15,924) and Cotochache (16,428). In no other part of the Andes are there so many colossal mountains brought together as on the east and west of this vast table-land of Quito.

Northward of this table-land the Andes bend rather more to the east, and at Almaguer they separate again into two branches. The eastern branch spreads out to form the group called Paramo (desert) de las Papas; and in latitude 2° 5′ this group sends off two branches; by which we have the Andes now divided into three subordinate chains, viz. the eastern, central, and western cordilleras of New Granada. The eastern cordillera extends towards Santa Fe de Bogota and the Sierra Nevada de Merida, east of the Magdalena river; the central cordillera runs parallel with the eastern to 5° N. lat., forming with it the sides of the valley of the Magdalena, and it continues to divide that river from the Cauca until their junction in 9° 23′ N. lat.; the western cordillera separates the valley of the Cauca from the low country of Choco, which last forms the eastern shores of the Gulf of Panama. Among these mountains are the Pic de Tolima (18,314 feet), and others always covered with snow; and there are also elevated plateaus, from 8000 to 9000 feet in height, on which are built the cities of Santa Fe de Bogota, Tunja, Sogamoso, and Leira.

The Andes terminate at the northern end by a junction with other ranges which proceed east and west through Venezuela. Near this junction is a vast group, called the Sierra Nevada de Santa Marta, spreading over a country 45 miles in width, and having peaks 19,000 feet high.

The higher regions of the Andes present themselves under three different forms. 1st. The active volcanoes, such as Cotopaxi, which have only one crater of vast dimensions, and which are conical mountains, with summits more or less truncated. 2nd. Those which, having been torn by a long succession of eruptions, have a jagged outline, being composed of numerous sharp points, like what are called needles in the Alps. 3rd. The rounded form, like Chimborazo, the most majestic of all, which, when seen from the Pacific, in a clear state of the atmosphere, stands prominently out from all the surrounding mountains. The Andes appear as a chain only when seen from a distance; for the inhabitants of the enclosed elevated table-lands see the mountains only as isolated peaks of moderate height. The valleys of this great mountain system are described by Humboldt as being truly sublime: deeper and narrower than those of the Alps and Pyrenees, the valleys of the Cordilleras present situations so wild as to fill the mind with fear and admiration. They are formed by vast rents, clothed with a vigorous vegetation, and of such a depth that Vesuvius might be placed in them without overtopping the nearest heights. Thus, the sides of the celebrated valleys of Chota and Cutaco are 4,875 and 4,225 feet in perpendicular height; their breadth does not exceed 2,600 feet.

Geological Formation.—When Humboldt visited America, nearly half a century ago, geology was comparatively little advanced; and the researches of himself and his companion Bonpland, however indefatigable, were necessarily inadequate to the full examination of such a vast range. Hence the geological part of Humboldt's work is considered to require the aid of more recent researches.

Near Tierra del Fuego some of the islands and coasts exhibit greenstone and mica-slate, while others show clay-slate, which seems to be a very prevalent formation. Many parts of this fragmentary and disrupted district have been the scene of volcanic action in former times.

The Andes of Peru and Chili are those which have been most examined in respect to their geological formation. Among the stratified rocks, gneiss is found at intervals throughout the greater part of the range, often associated with granite, and often passing into mica-slate. It frequently contains large quantities of garnet. Mica-slate is, next to porphyry, the rock of most frequent occurrence in the Andes. In the Nevada de Quindiu of New Granada it attains a thickness of more than 3,800 feet; it contains, in some places, beds of granular limestone, occasionally resembling the finest Carrara marble. Not far from Popayan it contains beds of quartz and beds

of gypsum. Clay-slate is found immediately under secondary formations in the table-land of Santa Fe de Bogota, and south of the equator it serves as a basis to the porphyry in the Andes of Quito. It is found immediately beneath a secondary limestone at the height of 12,800 feet in the ridge of the Andes of Peru. Quartz occurs among the Peruvian Andes, of the enormous thickness of 6000 feet, and there and elsewhere it covers many leagues. It contains gold, mercury, and sulphur, and specular iron in many places.

Red sandstone occurs in vast quantity, both among the Andes themselves, and also eastward of the range. It assumes all the varieties of texture from coarse conglomerate to fine-grained sandstone. Near Quito the red sandstone has a thickness of more than 5000 feet. The plains of Venezuela are composed of a series of secondary rocks, the lowest of which is a red sandstone, or conglomerate of rounded fragments of quartz and flinty slate united by an argillaceous cement, sometimes of as vivid a red as cinnabar. This sandstone appears at the surface over the greater part of the llanos, but towards the east it is covered by beds of limestone and gypsum. Beds of coal are found among the sandstone, at Santa Fe de Bogota and at Huanuco—the latter at 14,750 feet high, the greatest altitude where coal has yet been met with.

The red sandstone of New Granada is covered by lamellar gypsum and by fetid limestone, and at various parts of the range interlayers of different strata occur. Near Zipaquira rock-salt is associated with gypsum and limestone; while in other parts it is in near vicinity to galena, to porphyry, and to other mineral bodies. The red sandstone of the llanos of Venezuela is covered by a whitish-grey compact limestone; and a similar limestone is met with in various parts of the Andes of Peru, at elevations from 9000 to 14,000 feet; and near Pasco, in the Andes of Peru, at the height of 12,800 feet.

To what extent tertiary formations, and secondary formations later than the magnesian limestones, occur among the Andes, has not yet been well determined. Humboldt speaks of a tertiary deposit in the table-land of Santa Fe de Bogota, which appears to have been a lacustrine deposit, and in which he found enormous bones of the extinct species called the mastodon.

All the above stratified rocks have been found at heights below the loftiest peaks of the Andes. The summits seem generally to be either volcanic or composed of porphyry. Granite, which, in the old continent, rises to elevations of 15,000 feet, is never found at great heights in the Andes, and indeed forms but a small part of their external surface. Humboldt says, that one might pass years in travelling through the Andes of Quito and Peru, almost without seeing it, and he never met with it at a greater elevation than 11,500 feet. It is seen at the foot of the range in the plains of the Orinoco and Amazon, and on the shore of the Pacific between Lima and Truxillo. Porphyry is by far the most widely-extended of all the unstratified rocks of the Andes. Humboldt speaks of some masses from 16,000 to 19,000 feet in thickness; and of others where the porphyry takes the form of columns, as at Pisoje, at the western declivity of the volcano of Purace, where there is a colonnade, the pillars of which are eighteen feet high, and formed of regular prisms of five, six, and seven sides.

Another kind of unstratified rock is trachyte, which is a hard rock with a granular basis of glassy felspar, and including separate crystals of glassy felspar usually with a mixture of hornblende, and often mica; and these materials are united in so many different proportions as to produce rocks of very different aspects. Trachytes occur throughout the whole range of the Andes of Chili, Peru, and Columbia; often in columns of great regularity, as in Chimborazo, where it is met with in slender prisms of 50 feet long.

Volcanoes and Earthquakes.—No part of the world has been subjected to greater revolutions from volcanic fires than the range of the Andes. All the volcanoes, whether extinct or active, have burst forth amidst porphyries, basalts, and trachytes. Most of the lofty summits of the range are composed of trachyte, and the opening is usually in the latter rock. Many of the volcanic rocks now met with are supposed to be fused masses of rocks once stratified; while others are mineral nodules which have been softened by heat. Pumice-stone, which is nothing more than obsidian frothed up by the admission of air or watery vapour to it when it was in a fluid state, is found to a great extent in many of the volcanoes of the Andes; and volcanic-tuff, which is a stone more or less compact, made up of fragments of hard lava, cinders, and ashes, agglutinated together, covers immense tracks on the flanks of the Andes and on the table-lands. Snow, melted by the heat of the volcanoes, often washes down fragmentary rocks in torrents; and the water, mixing with loose earth, forms mud which is sometimes driven up as a mud-volcano.

The most considerable volcanoes of the Andes are situated not far from each other in the province of Quito. These are Cayambe, Cotopaxi, Pichincha, Antisana, L'Altar, and Tunguragua. Cayambe is situated just on the equator. Pichincha, Antisana, L'Altar, and Tunguragua, are all remarkable volcanoes; but the most dreaded of all is Cotopaxi (18,858 feet high). In 1738 the flames rose nearly 3000 feet above the edge of the crater. In 1744 the sound of the explosions was so loud as to be heard at a distance of 550 miles. In 1768, the quantity of ashes thrown out was so great that in the towns of Hambato and Tacunga such a degree of darkness was produced as to oblige the inhabitants to go about with lanterns for many hours in the day-time. In 1803 another eruption occurred. The form of Cotopaxi is the most regular and beautiful of all the colossal summits of the Andes. It is a perfect cone, which, covered with an enormous bed of snow, shines with a dazzling lustre at sunset, against the deep blue of the sky.

A region so underlaid by volcanic fires could not fail to be subject to repeated earthquakes; and accordingly no part of the world has suffered more from their dreadful effects. Sometimes the

shocks come without giving any warning at all; in general, however, the inhabitants are forewarned of the approach of the convulsion. The whole of Chili is particularly subject to earthquakes. The city of Copiapo was entirely destroyed in the year 1819, not a house being left standing; and the city of Conception has been twice destroyed, viz. in 1730 and 1751. An earthquake of tremendous force occurred on the 19th of November, 1822, which shook not only the whole of the low country of Chili, but *was felt* in the mountains, and even at Lima, Conception, Mendoza and San Luis. One of the most remarkable effects of this earthquake was the elevation of the land on the coast. Above a hundred miles of it was permanently upraised to the height of three or four feet, a portion of the bed of the sea being converted into dry land, covered with oysters, mussels, and other shell-fish.

Mineral Produce.—The Andes have been celebrated for their mines of metal since our earliest knowledge of America. Gold, silver, mercury, platina, copper, and tin, are met with. Gold is found in the form of grains and small rounded lumps, scattered through alluvial soils, which have been derived from the disintegration of rocks containing the metal, and most probably in the form of slender veins. The places chosen for digging into that auriferous soil are called *lavaderos*, because the gravel, sand, and earth, undergo repeated *washings* to separate the heavy particles of gold. The most considerable gold mines are at Petorea, Coquimbo, Copiapo, Pataz, Huailas, Curimayo, Zorata, Antioquia, Choco, and Barbacoas.

Silver is more abundant in the Peruvian than in the Chilian Andes. The richest mines are those of Pasco, in 11° S. lat., which have been worked since the year 1630. Here, as well as in other situations in Peru, the greatest part of the silver is obtained from an ore called in the country *pacos*, which is an intimate mixture of minute particles of native silver with brown oxide of iron. The mines of Chota are also very productive. They are situated in the mountain of Gualgayoc, at an elevation of 13,300 feet, where the thermometer in summer descends every night to the freezing point. The ore lies immediately beneath the surface. But the most celebrated are the silver mines of Potosi, in a lofty mountain. This mountain is perforated in all directions, and it is said that there are not less than five thousand excavations in it, some of them within 120 feet of the top, which is 16,000 feet above the sea-level.

Mercury, in the form of cinnabar or sulphuret of the metal, is met with at Azogué and other parts of the Andes; but the most celebrated, those of Guancavelica, were overwhelmed by incautious mining in 1789. Platina is met with in small quantities in Colombia. Copper and tin are found in the Chilian Andes.

ANDO'CIDES, the son of Leógoras, an Athenian, was born B.C. 467. In B.C. 432 he commanded, jointly with Glaucon, an Athenian squadron which was sent to aid the Corcyræans (Thucyd. i. 51). During the Peloponnesian war (B.C. 415) Andocides was involved in the charge of mutilating the Hermæ [ALCIBIADES], and, according to Plutarch, he saved himself by accusing some of his real or imaginary accomplices. After this event Andocides left Athens, and visited many foreign parts. On his return to Athens, the Four Hundred (B.C. 411) directed the administration of affairs, and Andocides was thrown into prison. On the overthrow of the Thirty Tyrants by Thrasybulus (B.C. 403), we find that Andocides was in Athens, and had some influence. The remainder of his life is obscure.

Four extant orations are attributed to Andocides: 'On the Mysteries;' 'On his Return to Athens;' 'On the Peace with the Lacedæmonians;' and that 'Against Alcibiades.' The authenticity of the third and fourth are disputed, and with good reason.

The best edition of the text of Andocides is that of Bekker, in his 'Attic Orators.' They were translated into French by the Abbé Auger. The oration 'On the Mysteries' was pronounced when Andocides was sixty-seven years of age. It is an admirable specimen of simple and perspicuous language, and equally remarkable for the skill with which the defence is conducted.

ANDORRA, a valley on the southern side of the central Pyrenees, lies between the department of Ariége, in France, and the town of Urgel in Spain. It is drained by the river Balira or Embellire, which falls into the Segre, a feeder of the Ebro. The territory is mountainous, but abounds in pasturage. Its forests produce a great quantity of timber, which is carried down the rivers Balira and Segre into the Ebro, and thence to Tortosa. The mountains abound in bears, wolves, wild boars, goats, and game. The population of the whole territory is 15,000, who procure corn and other necessaries by the produce of their trade in wood and iron. There are iron mines near the village of Canillo. Andorra, the capital, is situated on the river Balira, and contains 2,000 inhabitants. Andorra is an independent republic, governed by a council of 24, a syndic, who presides in the council, and by two viguiers, or magistrates, one of whom is appointed by the King of France and the other by the Bishop of Urgel. Louis le Debonnaire gave the sovereignty of this valley to Sisebertus, the first Bishop of Urgel, in 819, and from that time it has maintained its independence between France and Spain.

A'NDOVER. [HAMPSHIRE.]

ANDOVER. [MASSACHUSETTS.]

ANDRE', ST., or ST. ENDRE', a small town in Hungary, stands on the right bank of the Danube, about 13 miles N. of Pesth. The population is about 3,000, who are chiefly engaged in the cultivation of the vine.

ANDRE', JOHN, appears to have been a native of London, and to have been born in 1751. In 1769 he met at Buxton Miss Honora Sneyd, and the consequence was an immediate attachment, which became one of remarkable devotedness on his part, and which would seem to have been also returned by the lady. Her friends, however, interfered, and she was induced

not only to discontinue her correspondence with André, but some years after to give her hand to another. Meanwhile André had become a clerk in a commercial house in London. But on receiving intelligence of Miss Sneyd's marriage to Mr. Lovell Edgeworth, he determined to quit both his profession and his country, and having procured a commission in the army, he proceeded with his regiment to North America, then the seat of war between Great Britain and her colonies. In this new field of enterprize his talents and accomplishments soon raised him to distinction; and he attained the rank of major, with the appointment of adjutant-general to the North American army. In the summer of 1780 Major André was with the troops which occupied the town of New York under the command of General Sir Henry Clinton, when the infamous Arnold, who had been entrusted by Washington with the important position of West Point on the Hudson, about 60 miles above New York, sent over to the British commander his proposals for delivering that fortress into his hands—a scheme which, if it had succeeded, might not improbably have put an end to the war. On Arnold's overtures being accepted, André was appointed to conduct the negociation with him. While executing this commission he was taken prisoner, and notwithstanding the exertions of General Clinton and others in his favour, he was executed as a spy at Tappan on the 2nd of October, 1782. A monument was erected to his memory, at the public expense, in Westminster Abbey.

To his last moment André had cherished the hopeless passion which had driven him from his country and his early pursuits. In a letter written after his capture, which has been printed, he states that when he was stripped of everything, he had concealed the picture of Honora Sneyd in his mouth. This lady, although it does not appear that he had been informed of the event, had died of consumption only a few months before.

This unfortunate officer was a person of cultivated mind and elegant accomplishments. He excelled in painting and music, and was also no despicable writer of verse. His humorous poem entitled the 'Cow-Chase,' which appeared in three successive portions at New York, in 1780, the last being published on the very day on which the author was taken prisoner, is a production of decided talent. It is in the style of Cowper's 'John Gilpin,' which celebrated poem was not written till some years later. For further particulars respecting the subject of this notice, see Miss Seward's 'Monody on the Death of Major André,' 4to., London, 1781; a publication by Joshua Hett Smith, Esq., (the person who acted as his guide on his return to New York,) entitled 'An Authentic Narrative of the Causes which led to the Death of Major André,' 8vo., London, 1808; and an elaborate article in the 'Encyclopædia Americana,' under the head of 'Arnold, Benedict.'

ANDREA VANUCCI. [SARTO.]

ANDREASBERG, a town of 4000 inhabitants in the mining district of the Upper Hartz, in the kingdom of Hanover, stands at the southern foot of the Brocken, on a hill 1936 feet above the level of the sea. The neighbourhood is rich in mines, yielding silver, copper, iron, cobalt, and arsenic; and these, as well as the spinning of yarn, lace-making, and the rearing of cattle, afford profitable employment to its inhabitants. The shaft of the Sampson silver mine is 2333 feet deep. Andreasberg is 14 miles distant from Clausthal.

ANDREEWA, also called *Endery* or *Endri*, a town in the territory of the Kumucks, a Tartar tribe who dwell between the river Aksai and the Caspian Sea, in Asiatic Russia. The town is situated on the Aktash, and contains a population of about 12,000. It has a thriving market for the sale of slaves, and is the seat of some Mohammedan schools, to which the Circassian Mollahs are sent for education. The inhabitants of Andreewa, as well as those of Aksai, a town in the same territory, live chiefly by fishing, highway robbery, and kidnapping slaves.

ANDREOSSI (or ANDREOSSY, as he wrote it himself), COUNT, was born at Castelnaudary, in the province of Languedoc, in March, 1761. His family was of Italian descent. At the age of twenty he was made lieutenant of artillery. In the beginning of the French revolution he shared in the general enthusiasm for the new order of things, and he afterwards served under Bonaparte in the early Italian campaigns, and in Egypt, where he took a conspicuous part both in the military and the scientific labours of that celebrated expedition. He was appointed a member of the Institute of Cairo, and wrote several memoirs, 'On the Lake Menzaleh,' 'On the Valley of the Natron Lake,' 'On the Waterless River,' &c. When Bonaparte returned secretly to France Andreossi was one of the few officers who accompanied him, and he ever after proved devoted to the fortunes of his great commander. After the peace of Amiens he was sent as ambassador to England. When Napoleon assumed the imperial crown, Andreossi was made inspector-general of artillery, and a count of the new empire. He went afterwards as ambassador to Vienna, and having quitted his post when the war broke out again between Austria and France in 1809, he was present in the campaign of that year, and was appointed governor of Vienna after the taking of that city. He was next sent as ambassador to the Ottoman Porte, in which important situation he won the general esteem of both Franks and Turks. After the abdication of Napoleon in 1814, Louis XVIII. recalled Andreossi from Constantinople, and sent him at the same time the cross of St. Louis. When Napoleon landed from Elba he appeared again on the political stage to assist his old master in his last struggle. After the battle of Waterloo he withdrew again to private life, and busied himself in revising and publishing several interesting memoirs which he had written during his residence in Turkey. His work on 'Constantinople et le Bosphore de Thrace' is deservedly esteemed. His memoir 'On the Springs and Conduits by which Constantinople is supplied with Water,' contains much curious information on the art of hydraulics

as practised by the Turks. Andreossi had written also in 1810 a 'History of the Canal of Languedoc,' in which he claimed for one of his ancestors, François Andreossi, the principal merit in the planning of that great work, which had till then been ascribed to the engineer Riquet. This book was the occasion of much controversy with Riquet's descendants, in which the astronomer Lalande sided with the latter. Count Andreossi died in September, 1828, at Montauban.

ANDREW, kings of Hungary. [HUNGARY.]

ANDREW, SAINT, one of the apostles, the brother of St. Peter. His father's name was Janus. From the first chapter of St. John's Gospel, he appears to have been one of the followers of John the Baptist, whom he left at the call of Jesus, being the first disciple whom the Saviour is recorded to have received. According to St. Matthew and St. Mark, Jesus found Peter and Andrew together, following their occupation of fishermen, as he was walking by the Sea of Galilee, and called them, when they immediately left their nets and followed him; but this is supposed to have happened some time after the first interview recorded by St. John. That evangelist mentions Andrew as the disciple who intimated the presence of the lad with the few loaves and fishes, when the miracle of feeding the five thousand was performed. Such is nearly all that is stated respecting this apostle in Scripture.

The ecclesiastical historians, however, have professed to give us accounts in considerable detail of the latter part of his life. According to Theodoret, he employed himself for some years in journeying and preaching the faith throughout Greece; but Eusebius, and other writers, speak of Scythia as the province of his missionary labours. The common statement, however, is, that he suffered martyrdom at Patræ, now Patras, in Achaia, having been put to death by order of Egæus, the proconsul of that province. The year in which this event took place is not mentioned; but both in the Greek and in the Latin church the festival commemorative of it is held on the 30th of November.

ANDREWS, ST., an ancient city and burgh of Scotland, on the coast of Fifeshire and on the Bay of St. Andrews, 39 miles N.N.E. of Edinburgh, 56° 19′ N. lat., 2° 50′ W. long. St. Andrews stands on a peninsula, formed by the bay and the 'burn of Kinness,' a small stream which, skirting the town on the S. and E., forms, at its mouth, a harbour guarded by piers, and capable of receiving vessels of 300 tons at springtides: the navigation of the bay however is dangerous. The extremity of the peninsula on which the town stands is occupied by the ruins of the cathedral and by some other remains of antiquity.

Before the Reformation, St. Andrews was an opulent and commercial city. After that period however it gradually decayed; so that Dr. Johnson, who visited it in 1773, thus spoke of it, 'One of the streets is now lost; and in those that remain, there is the silence and solitude of inactive indigence and gloomy depopulation.'

The parish church of St. Andrews in South Street is a spacious structure, first erected in the year 1112, and rebuilt in 1798: it contains a monument to Archbishop Sharp, who was murdered near the town in 1679. There are three dissenting places of worship, one of which is Episcopal. St. Andrews was made a Royal Burgh in 1140: the magistracy consists of a provost, a dean of guild, four baillies, and a treasurer. The town, conjointly with Cupar, Anstruther Easter, Anstruther Wester, Crail, Kilrenny, and Pittenween, sends one member to parliament. The trade of St. Andrews is small. The number of vessels which belong to the port is 14, which are chiefly employed in the coasting trade; there are also 8 or 10 boats engaged in fishing. The population of the parliamentary borough of St. Andrews was, in 1841, 4449.

The University of St. Andrews, the most ancient in Scotland, was founded in the year 1411, by Henry Wardlaw, then Bishop of St. Andrews. There are at St. Andrew's the United College of St. Salvator and St. Leonard (formerly distinct), in which the several branches of general literature and science are taught, and St. Mary's College, which is appropriated to the study of divinity, and is attended solely by theological students. There is no medical or legal school connected with either college. St. Salvator's College was founded in 1455, by James Kennedy, nephew of James I., and successor of Wardlaw in the see of St. Andrews, and endowed with sufficient revenues for the maintenance of a principal, six fellows, and six poor scholars. The gothic chapel and tower of this college, erected by Bishop Kennedy, are much admired. St. Leonard's College was founded in 1512, by Prior Hepburn, and endowed by him from the revenues of a hospital for pilgrims, from the funds of the parish of St. Leonard's, and from property of his own. In 1747 it was found expedient to unite the two colleges. The joint establishment was accordingly transferred to St. Salvator's, and the buildings of St. Leonard's were sold, and converted into dwelling-houses.

St. Mary's College was formed out of the original seminary or 'Pædagogy,' as it was called, of Bishop Wardlaw, by James Beaton, archbishop of St. Andrews; and his designs were further carried on by his successors, Cardinal Beaton and Archbishop Hamilton. In 1579 the college was remodelled under the direction of George Buchanan.

The curriculum, or course of study in the arts, extends over four sessions. These studies are pursued at the United College, and the session lasts from the end of October to the beginning of May. St. Mary's College has professors of divinity, church history, and oriental languages, besides a principal, who also reads lectures on divinity. The study of mathematics also forms a branch of instruction at St. Andrews.

In each of the colleges are lodging-rooms for the students; and there are bursaries or endowments, entitling the holders to a certain income for so many years. Fifty-five belong to the United College, and seventeen to St. Mary's. ('Journ. of Educ.' vol. iv. p. 36.) The students

of St. Mary's pay no fees. The emoluments of the professors arise from their salaries, or, at the United College, from these with their fees in addition. The Senatus Academicus, by which alone degrees are conferred, is composed of the principals and professors of the colleges, and the rector of the university presides at its meetings. Those students who belong to the United College are required to attend divine service twice in the Sunday at the college chapel; except in the case of Dissenters, who are allowed to attend their own places of worship.

The revenues of the United College are somewhat more than 3000*l.* per annum, including the sums received on account of the bursaries. The revenue of St. Mary's, on the average for seven years before 1826, was rather greater than the expenditure, and amounted to above 1000*l.* The university has little property distinct from that possessed by the colleges individually, except the library, which contains upwards of 40,000 volumes. The officer of highest dignity is the chancellor, but his office is merely honorary: the rector is the acting head. A grammar-school, and a school for English writing and arithmetic, are under the patronage of the corporation.

Dr. Bell, the founder of the Madras system of education, gave 45,000*l.*, 3 per cent. stock, for the establishment of a seminary in this his native city, to be called the Madras College. The buildings devoted to the purposes of tuition in the Madras College were completed about the year 1836: the number of pupils attending in 1838 was 798.

The antiquities of St. Andrews consist of the ruins of the chapel of St. Regulus, or St. Rule, the traditionary founder of the place; the cathedral of St. Andrews, which was with several other ecclesiastical buildings nearly demolished, in June 1559, by a mob excited by a sermon of the celebrated John Knox; the ruined church of St. Leonard's adjoining the college of that name; and a wall about 870 yards in length, 22 feet high, and 4 feet thick, with 16 turrets at different distances, erected by Prior Hepburn in the beginning of the sixteenth century, to enclose for nearly the whole of their circuit the grounds of the great priory of St. Andrews, which had been erected about A.D. 1120. The enclosure is about 18 acres, and contains the ruins of the cathedral and St. Rule's chapel, besides the remains of some other buildings belonging to the priory. This wall having been constructed of durable stone is tolerably entire, and has three gates still standing. On the shore of St. Andrew's Bay, on a ridge or cliff, washed on the N. and E. by the sea, are the ruins of the castle, which serve as a landmark to seamen.

ANDREWS, LANCELOT, an eminent English prelate, born in London in 1565, was the son of a merchant of good repute. He received part of his education at Merchant Taylor's School, from which he was sent to Pembroke Hall, Cambridge, where he greatly distinguished himself. Having taken orders, he soon became known as a preacher. He was rapidly preferred in the church, and at the death of Queen Elizabeth was Dean of Westminster. When James I. came to the throne, he immediately became a great favourite, and was consecrated Bishop of Chichester in 1605. The king at the same time made him his lord almoner. He was subsequently translated, first to Ely, and lastly to Winchester. He died at Winchester-house, in Southwark, on the 25th of September, 1626, and was buried in the church of St. Saviour's.

The best known of the works of Bishop Andrews, are his 'Manual of Private Devotions and Meditations for every Day in the Week,' and a 'Manual of Directions for the Visitation of the sick.' After his death, several volumes of his sermons and lectures were published, from time to time. He was, also, one of the authors of the common translation of the Bible. The portions in which he was concerned were the Pentateuch, and the historical books from the Book of Judges to the Books of Kings inclusive.

Bishop Andrews was all his life a hard student, and is stated to have made himself conversant with all the learning of his age. Many eminent scholars of the time have all highly eulogized his extensive erudition, which was wont, it appears, to overflow in his conversation, as well as in his writings. He had, in addition to his learning and talents, the highest reputation for piety, hospitality, charity, and munificence. One of Milton's early Latin poems is an elegy on the death of this distinguished prelate, in which he is bewailed in a strain of the most impassioned regret and admiration.

ANDRO'MACHE, the wife of Hector. [HECTOR.] It is also the title of one of the extant tragedies of Euripides.

ANDRO'MEDA, a constellation, so called by the Greeks from Andromeda, the mythological daughter of Cepheus and Cassiopeia, who was bound to a rock and thus exposed to a seamonster, from whom she was delivered by Perseus. This constellation occupies a considerable region of the heavens below Cassiopeia, by which it may be thus found. A line drawn through the brightest star of the five in Cassiopeia, marked β, and the pole star, passes through a star of the first magnitude in the head of Andromeda, marked α, and called Alpherat. A line drawn through ι Cassiopeiæ, at the other corner, and the pole star, passes through Almach in the foot of Andromeda, marked γ, while in the line between the two stars thus found, lies Mirach, marked β, in the girdle of Andromeda.

ANDRO'MEDA, a genus of plants belonging to the natural order *Ericaceæ*. There are two species, with several varieties. They are shrubs, and are natives of Europe, Asia, and North America.

A. polyfolia, wild rosemary, is common in mossy bogs in the mountainous parts of England and Ireland, and on the lowlands of Scotland. *A. Rosmarinifolia*, rosemary-leaved marsh Andromeda, is a native of Newfoundland and Labrador. The plants may be grown from seed, and prefer a peat or sandy loam soil.

(G. Don, *Gardener's Dictionary*, art. *Ericaceæ*; Burnett, *Outlines of Botany*.)

ANDRONI'CUS, LIVIUS. [LIVIUS.]

ANDRONI'CUS CYRRHESTES, the supposed architect of the Tower of the Winds at Athens. The building takes this name from the figures of the eight winds being cut in relief on the exterior wall of the building, with their names above them on the frieze. (Spon, ii. p. 135, Amsterdam, 1679.)

This building was intended for a sun-dial, and it also contained a water-clock, which was supplied with water from the spring under the cave of Pan, on the north-west corner of the Acropolis. Colonel Leake is disposed to assign the date of this building to about B.C. 159.

(Leake's *Topog. of Athens; Library of Entertaining Knowledge.—Elgin Marbles*, vol. i. p. 29.)

ANDRONI'CUS was the advocate of the Jews under the reign of Ptolemæus Philométor in their proceedings against the Samaritans in Egypt, who asserted the authority of the temple on Mount Gerizim against the temple at Jerusalem. After the arguments were exhausted, both parties took up arms, and having found that blows could not decide the matter, they appealed to the king Ptolemæus Philometor, who appointed a solemn day of judgment. In full court it was agreed that those who were found in error should be killed for the bloodshed already committed. The Samaritan advocates, Sabbai (Sabbæus) and Theodosius, lost their cause against Andronicus, and were put to death. The arbitrary administration of justice in those times, and the character of Ptolemæus Philometor, render this account not quite incredible. (Josephus's *Antiquities*, lib. xiii. cap. 7; Jost's *Geschichte der Juden*, vol. ii. pp. 308, 309.)

ANDRONI'CUS RHO'DIUS, or the Rhodian, is said to have first arranged the works of Aristotle, after they had been brought to Rome in the library of Apellicon of Teos, by Sulla, B.C. 84; the manuscripts had been committed to the care of Andronicus by Tyrannion, the grammarian, who seems to have been originally employed to put them in order. Some authorities also refer to Commentaries of this Andronicus on certain of Aristotle's works. The first work, however, supposed to be by this writer, which was recovered in modern times, was a short treatise, published by David Hoeschelius, in 12mo., at Augsburg, in 1594, under the title of 'Andronici Rhodii Peripatetici Philosophi Libellus Περὶ Παθῶν.' There is also a Greek treatise on the 'Nicomachean Ethics' of Aristotle, which is attributed to this Andronicus. It was translated into English by W. Bridgman, London, 1807.

ANDRONI'CUS COMNE'NUS, emperor of Constantinople, was grandson of Alexis I. In his youth he distinguished himself in the army under his cousin, the Emperor Manuel, against the Turks and Armenians, but having entered into a treasonable correspondence with the King of Hungary, he was arrested and confined in a tower of the palace, where he remained twelve years. He contrived to escape, and after several romantic adventures arrived at Kiew, in Russia, where he won the favour of the Grand Duke Jaroslaus. Andronicus, in his exile at Kiew, became instrumental in forming an alliance between the Russian prince and the Emperor Manuel, and thus obtained his pardon from the latter. He led a body of Russian cavalry from the banks of the Borysthenes to the Danube, and assisted the emperor against the Hungarians at the siege of Semlin. After the peace, having returned to Constantinople, he protested against the adoption of Bela, prince of Hungary, who had married the only daughter of the emperor, as presumptive heir to the throne. Andronicus was himself next in the order of succession. The Emperor Manuel, however, having married a second wife, Maria, daughter of Raymund of Poitou, Prince of Antioch, had by her a son, who was afterwards Alexis II. From his dissolute conduct, and his intrigues, he excited the anger of the emperor, and was at length banished to Oenoe, a town of Pontus, on the coast of the Euxine, between Cape Heraclium and Cape Jasonium, where he remained till the death of Manuel, in 1180, and the disorders of a disputed succession, induced the patriarch, and the principal patricians, to recal Andronicus, as the only man who could restore peace to the empire. He arrived in the capital in the midst of acclamations, acknowledged the young Alexis as emperor, but arrested the empress-mother, who had been in some measure the cause of the troubles. Andronicus was associated in the empire as colleague and guardian to Alexis. He then developed his ambitious views. He first caused the empress-mother to be tried on a false charge of treasonable correspondence. She was condemned unheard, and was strangled, and her body thrown into the sea. He next murdered young Alexis himself, and then assumed the undivided authority as emperor in 1183. He married Agnes, Alexis's widow and sister to Philippe Auguste of France, who was still almost a child. 'Andronicus's short reign,' says Gibbon, 'exhibited a singular contrast of vice and virtue: when he listened to his passions, he was the scourge, when he consulted his reason, the father of his people.' Individuals and towns, for the gratification of his revenge, were treated with the greatest barbarity. At last, so many terrors drove the people of Constantinople to revolt; Isaac Angelus, one of the proscribed and a descendant in the female line from Alexis I., took refuge in the church of St. Sophia. A crowd assembled and proclaimed him emperor. Andronicus was then, with his young wife, in one of the islands of the Propontis; he rushed to Constantinople, but was overpowered, taken prisoner, and dragged to the presence of Isaac Angelus, who, without any form of trial, gave him up to the personal revenge of his enemies. He was insulted and tormented in every possible manner; his teeth, eyes, and hair were torn from him, and lastly, he was hung by the feet between two pillars. In his painful agony he was heard to appeal to heavenly mercy, entreating it 'not to bruise a broken reed.' At last some one ran a sword through his body, and put an end to his sufferings. This dreadful catastrophe happened in September, 1185; Andronicus was then past sixty years of age.

ANDRONI'CUS PALÆO'LOGUS, the Elder, son of Michael, emperor of Constantinople, was raised by his father as his colleague to the throne in 1273; and after Michael's death, in 1282, he reigned forty-six years more. The reign of Andronicus was disturbed by religious controversies and war. In 1303 a body of Catalonian and other adventurers came to Constantinople to assist Andronicus against the Turks. They defeated the Turks in Asia, but they ravaged the country, and behaved worse than the Turks themselves. Andronicus, partly by force and partly through bribes, succeeded at last in getting rid of these allies. In 1320, Michael, son of Andronicus, having died, Michael's son, Andronicus, distinguished by the historians by the appellation of 'the Younger,' revolted against his grandfather; and after several years of war, was crowned as colleague to the old emperor in 1325. Another sedition broke out in 1328, which ended in the abdication of the elder Andronicus, who retired to a convent. He died in his cell four years after his abdication, and in the seventy-fourth year of his age. During these disastrous wars between the two Andronici, the Ottomans effected the conquest of all Bithynia, and advanced within sight of Constantinople. Andronicus, the younger, died in 1341, in the forty-fifth year of his age, leaving by his wife, Jane or Anne of Savoy, a boy, John Palæologus, who was put under the guardianship of John Cantacuzénus. (Gibbon's *Decline and Fall;* the Byzantine Historians; Hammer, *Geschichte des Osmanischen Reiches.*)

ANDROS, an island of the Grecian Archipelago, lying S.E. of Eubœa, from which it is distant 6 miles. It is 21 miles long and 8 broad, and has a population of 18,000. The island is mountainous, and the highest summits retain the snow during many months in the year. The town called Andros, or Castro, is on the eastern coast, besides which there are 66 villages scattered over the island. The soil is very fertile; and produces excellent grapes, lemons, oranges, and pomegranates. Much wine is made, but it is all consumed by the inhabitants, who are great drinkers. Silk to the amount of about 3000 pounds is exported annually. Corn is imported from the Island of Eubœa. The N.W. point of Andros, called Point Guardia, is in 37° 57′ N. lat., 24° 42′ E. long.

ANDROS. [BAHAMAS.]

ANDROSCOGGIN. [MAINE.]

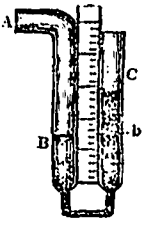
ANDUJAR, a town of Spain, in Andalusia, stands in 38° 10′ N. lat., 4° 25′ W. long., 40 miles E.N.E. of Cordova, on the right bank of the Guadalquivir, and at the foot of the Sierra Morena. The soil in the neighbourhood is very fertile, and produces wheat, barley, oil, wine, honey, and silkworms. The inhabitants amount to about 13,000, and are principally employed in agriculture, but there are also some tanneries, soaperies, and potteries. In the potteries are made the noted alcarrazas, or porous cooling drinking vessels of clay, for which the town is famous all over Spain.

ANDUZE. [GARD.]

ANEGADA. [ANTILLES.]

ANEMO'METER, from the Greek, signifying *wind-measurer*, is an instrument for ascertaining the force of the wind, generally by finding the mechanical effect which it produces on the apparatus. The first anemometer was invented by Wolf, and is described by him in his 'Elementa Matheseos,' vol. ii. p. 319 (Geneva, 1746). It consists of four small sails, like those of a windmill, which turn on a horizontal axis: this axis is connected by wheel-work with another in which is inserted one end of a bar carrying a weight. The wind acting upon the sails, causes this bar to turn in a vertical plane; and, when it is in such a position that the weight on it counterbalances the pressure of the wind, the angle which it makes with a vertical line passing through the axis affords a measure of the wind's force.

The anemometer invented by Dr. Lind may be thus described: AB, bC are tubes of glass each 9 inches long and $\frac{1}{10}$ inch diameter, which are open at their upper extremities, and are connected at bottom by a bent tube only $\frac{1}{10}$ inch diameter.



These are partly filled with water, and the wind acting at the end A depresses the water to some point, B, for example, when the column bC, whose height is the difference between the levels at B and C, is a counterpoise to the pressure of the wind on B. This difference can be ascertained by a graduated scale, and hence may be obtained the dimensions of a column of water whose weight is equivalent to the force of the wind. The velocity may thence be found, observing [AERODYNAMICS] that the velocities are nearly as the square roots of the resistances, and that on a square foot, the pressure of wind moving with a velocity of 20 feet per second, is 12 ounces. The connecting tube is made less in diameter than the others, as a check on the oscillations to which the water is subject from small variations in the force of the wind.

In Regnier's anemometer, a bar, carrying a wooden plate at right angles to it, protrudes from a box, through a hole, in the front of which it slides. This bar is met by a spring, which resists its further entry, until force is applied against the plate. In the interior of the box, the under side of the bar carries rackwork, which plays on a cog-wheel, the axis of which, passing through a side of the box, carries a hand round a dial-plate. The anterior surface of the wooden plate is presented to the wind, which presses upon it and forces back the bar, carrying the cog wheel and hand through an angle, greater or less, according to the greater or less impulse of the wind.

Professor Leslie having found that the cooling power of wind is proportional to its velocity, determined that velocity from the formula $V = 1 - \frac{9\,T}{2\,t}$ by means of a spirit of wine thermometer.

In this formula, V is the velocity of the wind in miles per hour, T is the time in which the top of the alcohol in the tube descends through half the

number of degrees to which, by the application of heat, it has been raised above the degree at which it previously stood; and t is the time in which the top of the alcohol, when exposed to the action of the wind and raised as before, descends through an equal number of degrees.

For a table of the force of winds, see AERODYNAMICS.

ANE'MONE is a genus of the natural order Ranunculaceæ, in which are comprehended many beautiful flowers. All the anemonies possess, in common with other Ranunculaceæ, the property of extreme acridity. The leaves of *A. pulsatilla* will raise blisters on the skin; if chewed, they produce irritation of the throat and tongue; and their roots, as well as those of *A. pratensis*, nearly related species, produce nausea and vomiting if administered in very small doses, on which account they have been strongly recommended by some medical men, in various complaints. The bruised leaves and flowers of *A. nemorosa* have been found to cure the tinea in the head of children.

A. coronaria, the common garden anemone, is found in a wild state in moist meadows in the south of France, Italy, and Greece, and different parts of Asia Minor. Dr. Russell speaks of it as abundant near Aleppo. In these places it is seen only in a single state, but even then sporting into a variety of colours, the principal of which are white, scarlet, and purple in different shades. In the gardens it is too well known to require description: the single varieties are usually called *poppy anemonies;* the double kinds owe their peculiar state either to a multiplication of the petals, or to a conversion of the stamens and pistills into petals. These have been procured by patient cultivation for some hundred years, and are still improving. When cultivated, they should be placed in a fresh loam, with a good deal of manure.

ANE'MOSCOPE, an instrument for determining the direction of the wind; usually constructed by connecting with the spindle of a weathercock the hand of a dial on which the points of the compass are marked.

ANENCHELUM (Agassiz), a genus of fossil fishes, from the black slate of Engi.

ANE'THUM. [DILL.]

ANE'THUM GRA'VEOLENS, Common Dill, is an umbelliferous plant, native of the south of Europe, Astrakhan, Egypt, and the Cape of Good Hope: it has either migrated or been introduced into Egypt and the Cape. It is also cultivated in England. It was in high repute among the ancients, both as a medicinal and a savoury herb, being mentioned by Hippocrates and Dioscorides. The fruit is the part which is used in medicine. To obtain the volatile oil, the bruised fruit is submitted to distillation with water. The colour is pale yellow, the odour peculiar, penetrating, and much disliked by some; hence the French name of the plant, *Fenouil puant*. The taste is hot, and rather sweetish.

A'NEURISM, is a Greek word (ἀνεύρυσμός), literally signifying, 'a widening, or extension:' it is now used to signify a tumour, consisting of a preternatural enlargement of an artery. The artery is the only seat of this disease; and any artery of the body may be the subject of it, but it is much more common in some arteries than in others.

An artery is composed of three membranes, which, in the healthy state of the artery, yield only to a certain extent to the impulse of the blood, so that the tube possesses only a certain diameter; but in a state of disease the impulse of the blood distends these tunics to a preternatural extent, causing that part of the artery which is diseased to swell out into a tumour or bag. The distension of the coats of the artery progressively increasing, they are at last capable of no farther stretching, and consequently are torn asunder and burst. But the inner and middle coats of the artery are not as extensible as the external coat; the two former coats are therefore ruptured a considerable time before the latter gives way, in which case the only proper coat of the artery forming the wall of the aneurismal tumour is the external. This coat in its turn getting progressively thinner and thinner as the dilatation goes on, at length bursts like the former; the blood escapes, and life is suddenly extinguished. But sometimes the tumour does not burst even after the rupture of the external coat of the artery; for there is placed around the artery a dense and strong membranous sheath consisting of what is termed cellular membrane, which sheath is far more extensible than any of the coats of the artery, and it is found that sometimes the aneurismal sac, or the bag-like tumour which the dilated artery forms, consists only of this condensed cellular membrane; all the proper coats of the artery having been rent and destroyed by the progressively distending force. Thus an aneurism may consist simply of the dilatation of the coats of an artery without the rupture of any; or of the dilatation of some with the rupture of others; or of the rupture of all; the bag of the tumour being formed solely by the cellular sheath of the artery.

The importance, in practice, of discriminating between this most dangerous disease and all other tumours is manifest; but the distinction is not always easy, or at any rate is not always made. Many a death has happened in consequence of incisions having been made into aneurisms which were mistaken for abscesses.

Excepting in the exceedingly rare case in which a spontaneous cure is effected, this disease, when left to itself, uniformly proves fatal by the ultimate rupture of the tumour, in consequence of which the patient expires either instantaneously, from the great and sudden loss of blood, or by degrees, from repeated losses of it.

The cure of aneurism consists in the obliteration of the preternatural cavity of the artery. The obliteration of this cavity is the sole object of the operation which is found to be the only sure and effectual mode of curing the disease. This operation consists in cutting down upon the artery and passing a ligature around it above its dilatation. The immediate effect of the ligature, of course, is to stop the flow of blood into the sac; its ultimate effect is to excite inflammation in the coats of the vessel, by which its sides, brought into

close contact by the ligature, permanently adhere together, thus inducing an obliteration of the cavity of the vessel.

(Cooper's *Surgery;* Hodgson on the *Diseases of Arteries and Veins;* Bell's *Surgery;* Abernethy's *Surgical Works.*)

ANGEL, a piece of money anciently coined and impressed with an angel. The angel was originally a gold coin of France, where it was first coined in 1340: it was always of fine gold, but not always of the same weight. It appears to have been introduced, with its minor divisions, the half angel and the quarter angel, into England by Edward IV., in 1465, and was continued as a coin by King Henry VI. when he returned to the throne. When first introduced, the angel was valued at 6*s.* 8*d.*, and being of the same value as the noble, was sometimes called the noble angel. In the latter part of Henry VIII.'s reign its value was raised to 8*s.*; in Mary's reign to 10*s.*, which value continued to the end of the reign of Charles I., who was the last English sovereign who coined the angel. The device on the obverse of the angel was the figure of St. Michael standing upon a dragon, and piercing him through the mouth with a spear. The reverse had a ship, with a large cross for a mast, with the royal arms in front. The obverse had the king's titles surrounding the device.

ANGE'LICA, a genus of plants belonging to the natural order Umbelliferæ; it comprehends several species, the principal part of which are to be met with in botanic gardens; and *Angelica archangelica*, or *Archangelica officinalis*, as it is now sometimes called, is much cultivated on the continent for the sake of its agreeable aromatic odour. Its blanched stems, candied with sugar, form a very agreeable sweetmeat, possessing tonic and stomachic qualities. Its roots contain a pungent, aromatic, stimulating principle, which has caused them to be employed in scrofulous diseases. They have been administered in the form of infusion and of powder, as diuretics and sudorifics; but in this country they are no longer employed as curative agents.

A very common wild species, the *Angelica sylvestris*, or wild angelica, which is found all over the meadows near the Thames above London, possesses similar properties, but they are weaker, and therefore less important.

ANGELICO. [FIESOLE, FRA GIOVANNI DA.]

A'NGELO BUONARROTI, MICHEL, was descended from the noble family of Canossa, in Tuscany, though the branch to which his father belonged had fallen into obscurity. He was born in the year 1474, a period peculiarly favourable to genius, when the states of Italy emulated each other in the cultivation of the liberal arts. Michel Angelo, the bent of whose powers manifested itself in his earliest childhood, learned the elements of design in the school of Domenico Ghirlandaio, a celebrated professor in Florence; and so precocious were his talents, that his master paid him a handsome sum from his first entry into his studio, as a reward for his services. While he pursued his studies with this master, a seminary was established for the promotion of sculpture by Lorenzo de' Medici, and Michel Angelo was invited, among other youths, to study from the collection of antique statues arranged in the Medicean gardens. He began, not merely by copying, but by investigating the principles on which the Greek artists had wrought, and having found a head of a laughing faun, considerably mutilated, he imitated that part of it which was perfect, and restored what was wanting. Lorenzo was struck by this demonstration of vigorous capacity; and he invited the youth to reside entirely in his house, where he remained three years. He executed for his patron a basso-rilievo in marble, the subject of which was the Battle of the Centaurs. Lorenzo died in 1492. His brother Pietro continued to patronize Michel Angelo, but in a different spirit. Treating art as a toy, he employed him, during a severe winter, to make a statue of snow; and manifesting in all things the same frivolous spirit, he precipitated, by his bad government, the downfall of his family, which was driven from Florence in 1494. On this event, Michel Angelo retired to Bologna, where he contributed two statues to the church of the Dominicans, and after a year's residence in that city, returned to Florence. During this time he made the celebrated statue of a Sleeping Cupid, which was sent to Rome, where it was shown as a piece of sculpture which had been dug up from a vineyard, and was pronounced by various connoisseurs to be a genuine antique, and superior to any thing which contemporary art was capable of producing. This statue having been purchased at a high price by the Cardinal S. Giorgio, the trick became known, and Michel Angelo's reputation was so much augmented by it, that the cardinal, though vexed at the deception, invited him to Rome. He devoted himself during this, his first residence in the imperial city, to intense study, and executed several works, particularly a Virgin weeping over the Dead Body of Christ, for St. Peter's church.

Several great works in art having at this time been projected by the government of Florence, Michel Angelo, at the earnest advice of his friends, returned to that city, and the first undertaking on which he exercised his talents was a gigantic statue of David, hewn from a solid block of marble. This sublime statue ornaments the great square at Florence. The Gonfaloniere, Pietro Soderini, was now anxious to enrich the city with some grand production of Michel Angelo's pencil. Leonardo da Vinci had been commissioned to paint an historical picture for one end of the hall of the ducal palace, and Michel Angelo was engaged to execute another at the opposite extremity. He selected a subject from the wars of Pisa. This cartoon, with the exception of a few dismembered fragments, has perished, but as long as it existed it was studied by artists from all countries. Michel Angelo had at this time attained only his twenty-ninth year, and had not only established his reputation as the greatest artist of his day, but had created by the novelty and grandeur of his style a new era in the arts. Julius II. called him immediately to Rome, and commissioned him to make his monu-

ment, a work conceived on a scale which Michel Angelo felt to be commensurate to his powers. To the design which the great sculptor made for this monument Rome and the world are indebted for the magnificent church of St. Peter's; for Michel Angelo having suggested to the pope that the interior of the old edifice would not allow sufficient space for the monument to be properly seen, the pontiff determined to rebuild the church on a larger scale.

Julius was ultimately induced, by the advice of his architect, Bramante, to suspend the execution of the monument, and he gave orders to Michel Angelo to paint the vault of the Sistine Chapel. Absorbed in the execution of the monument, he most earnestly endeavoured to decline the task of painting the chapel, and even alleged that he thought Raffaelle better qualified to perform it; but Pope Julius allowed no impediment to stand in the way of his will, and Michel Angelo, finding himself without an alternative, and impressed with a sense of the vastness and grandeur of the task, commenced his cartoons. He invited from Florence several artists distinguished as painters in fresco, a mode of practice in which he was then inexperienced, and the roof of the chapel was commenced by these assistants, under his direction; their execution, however, fell short of his expectations, and entering the chapel one morning he dismissed them all, threw their work from the walls, and determined on executing the whole himself. Having advanced to the third compartment, he had the mortification to find his labour frustrated by the bad quality of his materials, in which fermentation had taken place, and in utter disappointment he renounced the undertaking. The pope, being made acquainted with this misfortune, sent to him his architect, San Gallo, who investigated the cause of the failure, and taught him how to correct it. Thus reassured he proceeded, and the pontiff hearing at length that the cieling was half completed, could control his impatience no longer, and ordered the chapel to be opened for his inspection. Many other persons found admission, and among the rest Raffaelle d'Urbino, who then first became acquainted with Michel Angelo's powers as a painter. Struck with admiration he immediately changed his own style, and thanked God that he had been born in the same age with so great an artist. The work was now carried forward without interruption, and the whole was completed within one year and eight months from the time of its commencement; an achievement which, whether we consider the magnitude and sublimity of the performance, or the almost incredibly short time in which it was executed, is unparalleled in the history of art. The effect of the whole work is adapted with admirable accuracy to the vast height at which it is seen, and it is impossible to contemplate it without reverence and astonishment. The reign of Julius terminated in 1513, when Leo X. succeeded.

It might have been expected that Leo X. whose name is associated with the ideas of taste and munificence, and who affected fully to appreciate the powers of Michel Angelo, would have engaged him on some work worthy of his talents. There is, however, in his whole conduct towards this great artist a display of injustice not easily explained. The short reign of Adrian VI. which followed, although generally unfavourable to the arts, was less injurious to Michel Angelo, as it allowed him leisure to proceed with the monument of Julius II.; but on the accession of Clement VII. that work was again interrupted, and he was called on by the new pontiff to build a library and sacristy for the church of S. Lorenzo. The civil wars of Florence ensued soon after, and we find Michel Angelo acting in the capacity of engineer. On the expulsion of the Medici he was appointed superintendent of the fortifications by the local government, and he evinced extraordinary skill in fortifying the important post of San Miniato. As soon as the tumult consequent on the sack of the city had subsided, Clement VI. ordered strict search to be made for Michel Angelo, received him kindly, consulted him on various works, and the great picture of the Last Judgment was then projected. The death of Clement in 1533, suspended these intentions, and Michel Angelo now hoped that he should be enabled to complete the monument of Julius II. After several years' interruption, the monument was at length finished, on a smaller scale than had been originally projected, and placed in the church of San Pietro in Vinculo. Michel Angelo now found himself at liberty to proceed with the picture of the Last Judgment; he devoted to that immense work the labour of eight years, and it was finished in 1541. It was pronounced by contemporary criticism that Michel Angelo had in that work excelled all his former productions; but the deliberate judgment of time inclines to decide that his great name as a painter is better sustained by the compartments in the roof and on the sides of the Sistine Chapel, than by the picture of the Last Judgment. The career of Michel Angelo is an example of the splendid results produced by great powers in conjunction with great opportunities. We next find him engaged in constructing the magnificent fabric of St. Peter's church. On this work he was occupied during the whole remainder of his life. As he had occasion, among the number of persons employed in the undertaking, to promote some and dismiss others, he was beset by cabals, and harassed by opposition; and machinations were even employed to deprive him of his office: but he was uniformly supported by the pontiffs, especially by Julius III., who regarded him with profound respect and veneration. For this great work he constantly refused any remuneration, declaring that he dedicated that service to the glory of God. Old age came upon him not unaccompanied with the physical infirmities which belong to it, but he retained the vigour and alacrity of his mental faculties to the close of his long life. He died on the 17th February, 1563, having nearly attained his 89th year. His last words were, 'In your passage through this life remember the sufferings of Jesus Christ.' He was buried with due honours in the church of

the Apostoli at Rome, but his remains were afterwards removed to the church of Santa Croce, at Florence.

ANGELO BUONARROTI, the Younger. [BUONARROTI.]

ANGER. Bishop Butler ('Sermon upon Resentment') distinguishes resentment into two kinds, hasty and sudden, or settled and deliberate. Sudden resentment is often called anger, which is distinct from deliberate resentment, malice, and revenge. Sudden anger, he says, upon certain occasions is mere instinct; it is a natural passion and in itself indifferent. When St. Paul says, 'be angry and sin not,' he does not encourage anger, but he means, 'though you be angry, sin not,' where he makes a distinction between anger and sin, between the natural passion and sinful anger.

Anger may be occasioned by injury or contempt, in which case reason and understanding raise the anger by suggesting to us injury or injustice of some kind; and this is part of Aristotle's view of the matter ('Rhetoric,' ii. c. 2). But anger is often raised without even any appearance of injury, as distinct from hurt or pain. 'The real demerit,' says Butler, 'or fault of him who offers that violence which naturally excites anger, or is the cause of opposition or hurt, does not, in many cases, so much as come into thought.' There is therefore an anger which necessarily arises, and is distinct from the anger, whether hasty or deliberate, which is occasioned by injury or contempt. The reason and end of the instinctive passion of anger is considered by Butler to be, that we should be better qualified to resist and defeat sudden force, violence, and opposition, simply as such, and considered without regard to the fault or demerit of him who is the author of them.

Deliberate anger or resentment is not produced by mere harm without the appearance of wrong or injustice: 'it is not natural, but moral evil; it is not suffering but injury which raises that anger or resentment which is of any continuance.' 'The natural object or occasion of settled resentment then being injury, as distinct from pain or loss, it is easy to see that to prevent and to remedy such injury, and the miseries arising from it, is the end for which this passion was implanted in man. It is to be considered as a weapon put into our hands by nature against injury, injustice, and cruelty.' How it may be innocently employed is explained by Bishop Butler; and also its abuse.

ANGERBURG, one of the circles of the government of Gumbinnen, in the province of Eastern Prussia, containing 28,273 inhabitants. Angerburg is the name also of a small town, with a castle, lying on the Gross-Mauer Lake, in this province: population 2971.

ANGERMANLAND. [SWEDEN.]

ANGERMUENDE, a circle in the Prussian province of Brandenburg, containing 43,870 inhabitants. Also the name of the capital of the circle, built on the shore of the Lake of Münde; it has a population of 3000.

ANGERS, a town in France, in the department of Maine-et-Loire, of which it is the capital now, as it once was of the province of Anjou. It stands on the banks of the Mayenne, between the points of its junction with the Sarthe and the Loire, 178 miles S.W. of Paris, 47° 28′ N. lat., 0° 33′ W. long. In the ancient parts of the town the streets are narrow, and many of the houses are built of wood, though in some the wood is concealed by a thin covering of slate. The more modern quarters are regularly and well built. The old ramparts of the town are now replaced by boulevards planted with trees. Among the principal edifices are the castle and the cathedral. The former, on a steep rock, at the base of which the Mayenne flows, has walls of great height and thickness, flanked by eighteen massive circular towers, the work of early ages; the chapel and palace within the castle, built by René of Anjou, in the fifteenth century, are of much later date than the rest of the building. The cathedral, dedicated to St. Maurice, stands on an eminence in the centre of the town; it has two lofty spires. The architecture of the interior exhibits exquisite work, and there are fine painted glass windows and tapestry of great antiquity. The tombs which it contained were destroyed at the Revolution.

The manufactures of Angers are of sail-cloth, camblet, serge, handkerchiefs, hosiery, &c.; and there are establishments for bleaching wax, and refining sugar. Besides the articles from their own factories, the inhabitants carry on a trade in the agricultural produce of the surrounding district, corn, wine and brandy, flax, hemp, wax, honey, and dried fruits. The neighbourhood is famous for its nursery gardens, and especially for its extensive slate-quarries. The population of the town is 39,900.

Angers is the see of a bishop, and the seat of a cour-royale; it has a university academy, with jurisdiction over 18 colleges, 18 boarding-schools, 2 normal schools, and 1212 day schools, which are spread over the departments of Maine-et-Loire, Mayenne, and Sarthe. There is also in Angers a college, a school of medicine, a seminary for the education of the clergy, a school for deaf-mutes, a public library which contains 26,000 volumes, a museum of natural history, a fine collection of French paintings, a botanic garden, an agricultural society, and a royal school of arts and trades. There are two theatres in the town. Steamers ply daily from Angers to Nantes, Tours, and Orleans; and diligences run daily to Paris.

(Balbi, *Géographie;* Murray's *Hand-Book of France.*)

ANGERSTEIN GALLERY. [NATIONAL GALLERY.]

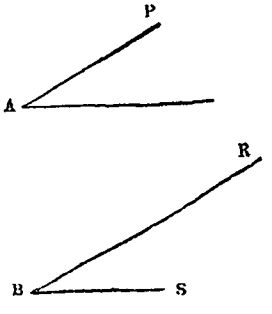
ANGINA PECTORIS, literally, 'a contraction or tightening of the chest,' a disease so named from the anguish felt in the chest. This disease is characterized by a sudden attack of severe pain in the lower part of the chest, commonly inclining to the left side; the pain is sometimes so severe, that the patient feels as though he must die: the pain generally extends to the left arm, and occasionally also to the right; it is often attended with a sensation of fainting

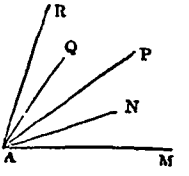
or of suffocation, and with palpitation of the heart, but frequently these latter symptoms are absent; the pulse is commonly quick, weak, irregular, or intermittent, though sometimes it is little affected; the countenance is commonly pallid, and the expression anxious and depressed. This attack comes on in paroxysms, which last from a few minutes to half an hour and more. There is no regular interval between the paroxysms, and no distinct warning of their return. They usually come quite suddenly, from slight causes, and often when no cause can be assigned. The health at first is tolerably good during the intervals, but in the progress of the disease a great variety of uneasy sensations distress the patient, even when the paroxysm is absent, chiefly those which indicate a disordered state of the digestive and respiratory organs. The disease requires varied treatment according to the state of the patient, but there is one remedy that should never be neglected, and that is, absolute rest during the paroxysm of the attack.

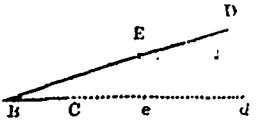
ANGIOSPERMA. [DIDYNAMIA.]

ANGLE, RECTILINEAR, from the Latin word *ángulus*, of the same signification. The notion (for it can hardly be called definition) is the *opening* made by two straight lines which cut one another. The term *inclination* is also used synonymously with angle, thus, the angle or opening of two lines is called their inclination to one another.

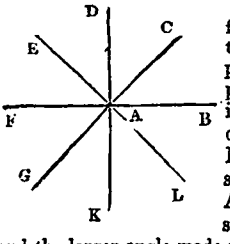
Take the two angles or openings made at the points A and B by the straight lines A P and A Q at A, and by B R and B S at B, and transfer the first figure to the second, so that the point A shall fall upon B, and the straight line A Q upon B S; or rather let as much of A Q as is equal to B S fall upon B S, and let the remainder of A Q form a continuation of B S: also let A P and B R be made to lie upon the same side of B S. We have now no longer any control over the position of A P with respect to A Q, since the first figure is not to undergo any change except that of simple removal into another position. If, after A Q has been placed upon B S, A P then fall upon B R, the two openings or angles at A and B are the same. If A P, in its new position, fall between B S and B R, the opening or angle at A is less than that at B; and if A P fall further from B S than B R does, the angle at A is greater than that at B. The angle at A is called the angle P A Q, and that at B the angle R B S. Hence the notion of one angle being twice or three times, &c., as great as another may be fixed. For example, the angle M A P being made up of the two M A N and N A P, each of which is equal to the angle D B C,







is twice D B C; the angle Q A M is three times D B C; R A M is four times D B C; and so on. Similarly, the angle D B C is one-half of P A M, one-third of Q A M, &c. The angle made by two lines does not depend upon the length of these lines; if a part D E be cut off from B D, the angle is not altered, that is, the angle E B C is the same as D B C. If B e and B d be respectively equal to B E and B D, and if B C e d turn round B, the same *quantity of turning* which brings B e into the position B E, will bring B d into that of B D.



If a line setting out from A B be conceived to revolve round the point A, it will in every position form two openings or angles with its original position A B. For example, in the position A C, A B and A C will form the smaller angle B A C, and the larger angle made up of the angles C A F, F A K, and K A B. Only the former of these is usually considered in geometry, but the latter is frequently used in analysis. When half a revolution has been made, and A B has come to A F, at first sight we might say there was no angle formed; but on looking at the preceding position A E, we see that the opening of B A and A F is greater than that of B A and A E. The half of this opening B A F, that is, B A D, is called a right angle. A whole revolution makes A B pass through four right angles, and, in analysis, if we wish to point out that the line A C is supposed to have made a complete revolution, and to have come into the position B A C for the second time, the angle made with A B is said to be

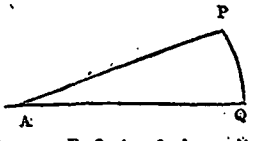
4 right angles + B A C.

An angle is said to be *obtuse* when it is greater

than one right angle, and less than two, and *acute* when it is less than one right angle.

For the most important properties of angles see TRIANGLE, PARALLEL, POLYGON, TRIGONOMETRY.

The methods of measuring an angle, of which we think it necessary to take notice, are three in number. The first is the one universally employed in *theoretical* investigations, and is as follows:—the number which expresses what proportion the arc P Q is of the radius, is the number chosen to represent the angle. It is shown in geometry that if any number of arcs be drawn with the centre A, subtending the same angle P A Q, what part soever any one of them is of its radius, the same part is any other of *its* radius. That is, whatever circle may be chosen, the preceding measure gives the same number for the same angle. For example, if the arc P Q be equal to the radius, the angle P A Q is the angle 1. If P Q be two-thirds of the radius the angle P A Q is the angle ⅔. The unit of this measure is therefore the angle whose arc is equal in length to its radius. It is customary to say that an angle or arc (for the terms are frequently confounded) thus measured, is given in parts of the radius: but this expression does not convey much meaning, and we cannot propose any better, unless it might be judged proper to say it is measured in *theoretical* units, meaning thereby in the units which are always employed in pure theory. The *theoretical* unit would then be the angle subtended by the arc which is equal to its radius. This might also be called the *arcual* unit.



The semi-circumference of a circle contains its radius.

3·14159, 26535, 89793, 23846

times, very nearly. This is then the number of theoretical units contained in two right angles. The right angle is therefore

1·57079, 63267, 94896, 61923,

and the following are the angles of one degree, one minute and one second, to which we shall presently come:

·01745, 32925, 19943, 29577	degree
·00029, 08882, 08665, 72160	minute
·00000, 48481, 36811, 09536	second.

In the second measure, in which angles are said to be measured in *space* (the word space being here opposed to *time*, as we shall see, and not to *length*), the whole angle traced out in one revolution, equal to four right angles, is divided into 360 equal parts, each of which is called one *degree*, and marked thus (°). Each degree is divided into 60 equal parts, each called one *minute* (′), and each minute into 60 equal parts, each called one *second* (″). Formerly, the second was divided into 60 equal parts called *thirds*, and so on, but it is now usual to use the tenths, hundredths, &c., of seconds. The present table therefore stands thus:

A whole revolution = 360° = 21600′ = 1296,000
A right angle = 90° = 5400′ = 324,000

Degrees.	Minutes.	Seconds.
1	60	3600
	1	60

In the attempt to effect a universal change of weights and measures which followed the French Revolution, the circle was divided into 400 degrees, each degree into 100 minutes, each minute into 100 seconds, and so on. This innovation obtained only a partial introduction, and is now entirely abandoned. When used, it is customary in this country to distinguish the French degrees by the name of *grades*, and to denote one grade by 1^{gr}. The convenience of this method, from its close affinity with the decimal system, is certainly great: for example, grades and decimals of grades, such as 12^{gr}. 1329 are converted into grades, minutes, and seconds, by mere separation of the figures: thus, 12^{gr}. 13′ 29″.

1^{gr}	is	0°·9	or	54′	or′ 3240″
1′	„	0 ·009	„	0′·54	„ 32″·4
1″	„	0 ·00009	„	0′·0054	„ 0″·324

The third method of measuring angles, in which they are said to be measured in *time*, is confined to astronomy, and is derived from the complete apparent revolution of the heavens which takes place in 24 hours. That is, if a line revolve round a point at the rate of a whole revolution in 24 hours, or a right angle in six hours, the times of moving through different angles are made the measures of their comparative magnitudes. Thus 4^h 32^m 60^s is the angle moved through in 4 hours, 32 minutes, and 60 seconds. The degree, minute, and second of space are 4^m, 4^s, and one-fifteenth of a second of time: and the hour, minute, and second of time are 15°, 15′, and 15″ of space.

The following summary may be found convenient.

An *angle* is the opening of two lines; *rectilinear*, of two straight lines; *curvilinear*, of two curves; *mixtilinear*, of a straight line and a curve. But in truth angle always means rectilinear angle, and when a curve enters, its tangent is the straight line which is used in determining the angle.

A *right* angle is half the opening of a straight line and its continuation; an *acute* angle is that which is less than a right angle; an *obtuse* angle is that which lies between one and two right angles. *Complemental* angles are two which together make a right angle; *supplemental* angles are two which together make two right angles. When lines meet and make a pair of angles, the one less than two right angles, is called *salient*; the other, greater than two right angles, is called *re-entrant*, or *re-entering*. None but salient angles are mentioned by Euclid. For salient and

re-entering (which are borrowed from fortification) *direct* and *retroflected* have sometimes been used.

The angles which two lines make with the same part of a third, on opposite sides of it, are called *alternate*. Two lines which cross one another make two pair of *vertically opposite* angles. The angles made by adjacent sides of a figure are called *internal*; those made by any sides with adjacent sides produced are *external*. When the angular point is the centre or on the circumference of a circle, the *angle* is said to be *at* the centre, or *at* the circumference. Beginners often confound the angle with the angular point.

The angle of *contingence* or of *contact* is an old notion of the opening made by two curves, or a curve and a line, which touch. In modern mathematics, when a curve is supposed to be composed of infinitely small rectilinear elements, the infinitely small acute angle made by one element with the production of the next does duty for this old angle of contingence.

A *spherical* angle is made by two circles (usually great circles) of a sphere. When the circles meet at the pole of the equator, and one of them is the meridian, the angle is an *horary* or *hour-angle*; and when neither is the meridian, the angle is frequently called *horary*. The *angle of position* of a star is that made by the circles drawn to it from the poles of the equator and ecliptic. The angle of *elevation* is the angle made by a line drawn from the eye to any object with the horizontal line which is in the same vertical plane as the first line; but when the object is below the horizon, the term is angle of *depression*. When lines are drawn from two points to a third, those two points, and also the line joining them, are said to *subtend* the angle which is made at the third point. The angle which two objects subtend at the eye is their angle of *elongation*. The *angle of the vertical* is a name given to the angle which a line drawn to the spectator's zenith makes with his radius of the earth produced: it is taken as nothing when the earth is supposed to be a perfect sphere. Angular terms, such as right ascension, longitude, &c., with which the word *angle* is not usually coupled, are not considered here. The *parallactic* angle is simply the PARALLAX.

When one line falls upon another, the angle of *incidence* is the acute angle which the incident line makes with the perpendicular to the other. When the incident line is thrown off again on the same side as that from which it came, the acute angle made with the perpendicular is called the angle of *reflexion*; when on the opposite side, the angle of *refraction*. These terms are nearly confined to optics.

A *dihedral* angle is the opening made by two planes: it is measured by a rectilinear angle, namely, that made by two lines drawn in the two planes perpendicular to their common intersection. But the rectilinear measure is not the same thing as the dihedral angle, though the two are often confounded: we might just as well say that the pressure of the air is the same thing as the number of inches in the barometrical column of mercury.

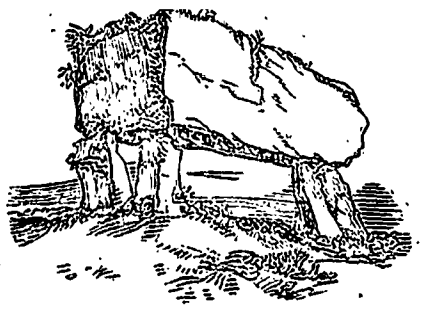
A *solid* angle is said to exist when three or more straight lines, not in the same plane, meet at a point. It is a complex idea, and the best notion of it as a magnitude is derived from considering it as measured by the area of the spherical triangle which subtends it.

ANGLE, TRISECTION OF. [TRISECTION OF THE ANGLE.]

ANGLES, or ANGLI. The earliest record of this people we find in Tacitus's book on the Germans (chap. xl.); but this author only mentions their name, states a few particulars relative to their religions, and intimates that they were a branch of the Suevi. It is clear that Tacitus knew very little about these nations. Lindenbrog and Leibnitz ('Scriptor. Rerum Brunsuicens.' tom. i. p. 81) have preserved fragments of the ancient laws used in common by the Angli and the Varini. D'Anville has in his map assigned to them the same district which they occupied in the fifth century, before their emigration to England, and parts of which the modern Angles still occupy. He allots to them the greatest portion of modern Schleswig, and some part of Holstein, making the German Ocean their western boundary, the Saxons their nearest neighbours on the south, the Varini on the south-east, and the Jutes on the north. It is impossible to fix with accuracy any boundaries for the Angli from the account given by Tacitus, but his statement appears perfectly reconcilable with D'Anville's map and the Saxon Chronicle; and it is remarkable that D'Anville in every respect agrees with the last-mentioned record, although it may be doubted whether he knew it, or paid any attention to it. [SAXONS.]

ANGLESEY, or ANGLESEA, an island in the Irish Sea, on the N.W. coast of Wales, in which principality it is included, and from the main land of which it is separated by the Menai Strait. This strait has a direction very nearly N.E. and S.W. From the S.W. end of this channel the coast runs N.W. to the farthest point of Holyhead Island, which is separated from the rest of Anglesey by a sandy strait. The general direction of the N.E. coast is from N.W. to S.E. The N.W. end of the island is much indented. The breadth of the island, from Aber-Menai Ferry to Trwyndû Point, is 17 miles; the length, from Carnel's Point to the Menai, is about 20 miles. There are several smaller islands round the coast. Holyhead, the largest of these, is at the western extremity; Priestholm, or Puffin Island, at the eastern; the others are insignificant.

This island had, in early times, the names of Ynys-Dowell (the shady or dark island), Ynys-Fon (the farthermost island), and Ynys-y-Cedeirn (the island of heroes). By the Latin historians it is called Mona (which name it shared with the Isle of Man); the name of Anglesey (which signifies island of the Angles), it received from the Saxons. It was a great seat of Druidical superstition. Several Druidical remains still exist, especially *cromlechs* (flat stones resting upon others), and *carnedds* (heaps of stones). One of these cromlechs is here shown.



Cromlech in the Park of Plas Newydd.

With the exception of a short government by the West Saxons in the ninth century, Anglesea was governed by native princes till the reign of Edward I., when it became subject to England.

The climate of Anglesey is rendered by the sea breezes milder than that of the adjoining part of Wales; snow seldom lies long, even in the depth of winter; but the air is, from the same cause, loaded with frequent mists in autumn. The surface of the island is comparatively flat; and the scarcity of trees, as well as of quickset hedges, gives it a barren appearance. The limited extent of the island does not admit the formation of any considerable stream. The coast forms several harbours, the principal of which are Beaumaris and Holyhead. That of Amlwch has been formed by excavating the rock.

The soil of the island is various: the lands on the sea-coast, especially on the western side, are sandy: the low grounds are chiefly covered with a peaty earth, from which the peasantry dig turf for fuel. The more prevalent soil is, however, a stiffish loam, which, when manured with sand, produces abundant crops. The chief agricultural productions are oats and barley; of wheat the proportion is small, and of rye still smaller. Potatoes are grown in greater quantity than in any other part of North Wales, and the cultivation of the turnip is on the increase. Pasturage is, however, the great object of the farmer's attention, for only one-eleventh of the enclosed lands is estimated to be under tillage. Cattle form one of the staple productions of the island, and numerous herds are exported. The Anglesey sheep are the largest native breed in North Wales; they have white faces and legs, and are generally without horns. The export is from 5000 to 7000 head annually. The coasts supply abundance of fish.

The mineral riches are great. The Mona and Parys copper mines are noticed under Amlwch. Lead ore, rich in silver, has been found also in Parys Mountain. Limestone ranges traverse the island; marbles, both white and variegated, are procured; mill-stones are quarried at Redwharf and Penmon; and there are coal-mines at Malltraeth, but they do not appear to have been worked with much success.

The main road to Holyhead, the usual place of embarkation for Dublin, runs through the island. It crosses the Menai Strait over a magnificent suspension-bridge. A tubular bridge is now in course of construction, to carry the Chester and Holyhead Railway over the same strait.

The county of Anglesey is divided into three cantrefs, a division which originated at a very early period; and these cantrefs are subdivided each into two comots (cwmwds). For civil purposes Anglesey is divided into six hundreds, which are equivalent to the comots. It is in the diocese of Bangor and in the province of Canterbury, and in the North Wales circuit.

The chief towns are Amlwch, Beaumaris, Holyhead, and Llangefni. The population of the borough and parish of Llangefni, in 1841, was 1755. [Amlwch; Beaumaris; Holyhead.] Holyhead, Amlwch, Beaumaris, and Llangefni form a district which returns a member to Parliament, and the county returns another. The county election and that for the district of boroughs are both held at Beaumaris; and the poll for the county is taken at Beaumaris, Holyhead, and Llangefni.

The area of the county of Anglesey is 271 square miles or 173,440 acres; and the population, in 1841, was 50,891.

ANGLO-SAXONS. [Saxons.]

ANGO'LA, a country on the west coast of Africa, lying between 8° 20′ and 9° 20′ S. lat., bounded on the N. by Congo, and on the S. by Benguela. It was first discovered by the Portuguese navigator, Diego Cam, in 1486. Very soon after this the Portuguese began to form settlements both along the banks of the Zaire, and at various points of the coast to the south of that river. It was not, however, till 1578 that the town of Loando, the capital of Angola, was begun to be built, and it became the residence of the Portuguese governor. In 1640 the Portuguese were driven from Loando by the Dutch, who retained possession of the place till 1648, when it was recovered by its former masters. It has ever since remained in the hands of Portugal.

Mr. Bowdich states, that the Portuguese settlements extend into the interior for about 700 miles from the coast, and that they comprise forts and commercial depôts, separated by considerable distances. Two of these depôts or *feiras* (fairs), are 700 miles inland, and are under the superintendence of a Portuguese resident. The Portuguese colonists and the natives meet at these stations for the purposes of exchange. One of them, Cahenda, is on the south bank of the river Manibella. Lower down the river is Bangoa Quitamba, in long. 17°. Among the Portuguese forts are—Fort Massangano, at the junction of the river Lucala with the Coanza; Fort Cambambe, higher up the Coanza; Pungo Andongo, at the junction of the Gango with the Coanza; Fort Pedras in the same vicinity, but not on the river; and Fort Ambaca on the Lucala.

Loando (8° 50′ S. lat., 13° 4′ E. long.) is built partly on the mainland, and partly on the island of Loando, which lies about a mile from the shore, and is 10 leagues in length. Loando was formerly celebrated for the magnificence of its

churches and other ecclesiastical buildings; besides a cathedral, it contained a convent, a hospital, and a Jesuit's college of great extent. It was formerly the seat of a bishopric. The present town is described as situated considerably to the north of the ancient town and port, the former of which is in ruins, and the latter blocked up. The principal part of the town stands on an eminence, which juts out towards the island, and on the extremity of which the largest citadel is placed. There are two other batteries besides this. The lower part of the town, however, is the most crowded. It is inhabited, for the most part, by the negroes of the country, and consists merely of a crowd of mean hovels. When Captain Owen visited the coast in 1825, he described Loando as extending for about a mile and three quarters along the shore. The market was found to be well supplied with fruit and vegetables, and bullocks and goats were also in great plenty. The country around is described as dusty and parched; but the town is well supplied with excellent water. The country has been divided by the Portuguese into seven districts:—Loando, that in which the capital is situated; Danda, adjacent to the river of the same name, described as abounding in corn, fruit, and venison; Benga, on the banks of the Benga (otherwise called the Zenza), and altogether inland; Moseche, between the Lucala and the Coanza, being the province in which the two forts of Massangano and Cambambe are situated; Illamba, between the Danda and the Benga, divided into the lower province next the sea, and the higher, called otherwise Lumbo, farther inland; Oarii, to the east of the former; and Embacca, or Membacca, comprehending the upper region of the Lucala.

The language spoken in Angola is the Bunda, which appears to be merely a dialect of the Congoese, or that spoken as far north as Cape Catherine. A grammar and dictionary of this tongue have been compiled by Father Cannecattim. The government, laws, and religion prevailing among the natives of Angola are in their general features the same with those of the other negro tribes of Africa. The supreme authority in each district is in the hands of a single ruler, who is subject to no regular control. A tax is levied by the Portuguese from the inhabitants of Loando, and of the other small districts where they have erected forts. In the course of the sixteenth century various missions were sent out by successive popes with the object of diffusing the knowledge of Christianity among the inhabitants of this part of Africa; and by dint of force as well as of persuasion, a good many converts were made. There is reason to believe, however, that the number of negro Christians in Angola is now very inconsiderable. The exports from Angola, since it has been in the hands of the Portuguese, have consisted chiefly in slaves and ivory: the slaves having been sent from thence to Brazil. A little gold, iron, and copper, are met with in some parts of the country, but scarcely sufficient to pay for working.

The physical characteristics of the country and the neighbouring regions are noticed under Congo.

ANGO'RA. [Ancyra.]

ANGOSTU'RA, properly *Santo Tomé de la Nueva Guayana*, is a town in South America, on the Orinoco, in the republic of Venezuela, at a distance of about 240 miles from the mouth of the river, in 8° 8′ N. lat., and 63° 55′ W. long. The town is built on the south bank at a place where the bed of the river is narrowed on both sides by rocks, and to this circumstance it owes its name Angostura, which signifies the 'Strait.' The town lies between the foot of a hill and the river, and the houses stand partly on the bare rock; they are in general lofty, agreeable, and the greater part built of stone. On the tops are terraces, where people sleep in the season of the greatest heat. The streets are regular, and for the most part parallel to the course of the river. In 1807 the population was about 8500, of whom 300 were negroes: at present it is said not to exceed 4000. The narrowest part of the river lies between the two forts, San Rafell and San Gabriel, which are on opposite banks, and here its breadth was found by Baron Humboldt to be 2430 English feet; opposite the town it was 3134 feet. Though at so great a distance from the ocean, the town is only about 191 feet above the level of the sea; and notwithstanding its tropical situation it enjoys a mild and equal temperature. This is, in part, to be attributed to the trade-winds, which blow regularly from the month of November to the month of May. The trade of Angostura has been nearly annihilated by the disturbed state of the country; before the beginning of the civil wars it was considerable. For the purposes of trade it is very advantageously situated. The channel between the town and the island Del Medio, which lies between the two forts mentioned above, has 200 feet of water, when low, and on the increase of the river 50 or 60 feet more. But large vessels cannot sail up to the town on account of the shoals, which are very frequent in the lower part of the Orinoco: only such as do not draw more than 8 feet can navigate it with safety. The best vessels require 15 days to sail from its mouths to Angostura; but otherwise the mouths of the Orinoco have an advantage over every other part of Colombia.

The inland trade of Angostura extends to a great distance westward by means of the numerous large navigable rivers which run from the eastern declivity of the Cordilleras to the Orinoco. The trade with the country round Varinas was very active, and considerable quantities of cacao, indigo, cotton, and sugar, were brought to Angostura, which sent back the produce of the manufacturing industry of Europe. Hides and jerked meat form a considerable article of commerce.

(*Travels* of Baron Humboldt and Depons.)

ANGOULEME, the capital, formerly of the province of Angoumois, now of the department of Charente, in France, is situated on the left bank of the Charente, 287 miles S.S.W. of Paris, in 45° 39′ N. lat., 0° 9′ E. long. It stands on a high hill above the valley of the Charente. The air is pure, and the prospect from the ramparts, which have been changed into public

walks, is extensive and fine. Though occupying so high a site the town is abundantly supplied with fresh water, which is raised by machinery recently established. The population, including the suburbs, is 18,900. The Charente is navigated by steamers up to Angoulême. The ancient part of the town is ill-built, and the streets are narrow; but the modern part is much better in these respects. Among the principal buildings are—the castle, which was the residence of the ancient counts of Angoulême, the cathedral, the bridge over the Charente, and the obelisk, raised by the government of Charles X. to the Dauphiness, whose husband took the title of duke from the town. This obelisk has been since 1830 dedicated to Liberty. The principal scientific establishments are—a college, a seminary for the education of the clergy, schools of midwifery, design, and chemistry, a museum of natural history, and a public library, which contains 14,000 volumes and some valuable manuscripts. The chief manufactures are paper, woollen stuffs, and earthenware: there are also distilleries and sugar works. Angoulême is the seat of a bishop, whose see includes the department of Charente.

It is a town of great and indeed unknown antiquity. It was the Iculisma of the Romans, and its ancient designation may be traced in its present one. In the ninth century it was ruined by the Normans, and was twice taken by the Huguenots in the sixteenth century.

(Balbi, *Géographie;* Murray's *Handbook of France.*)

ANGOULÊME, CHARLES DE VALOIS, DUC D', the natural son of Charles IX. of France and Marie Touchet, was born on the 28th of April, 1573, about a year before the death of his father. He was educated for the church, and at the age of sixteen was made grand prior of France; that is, head of the order of the Hospitallers of St. John of Jerusalem, or Knights of Malta. However, having received soon afterwards, by the bequest of Catherine de' Medicis, the earldoms of Auvergne and Lauraguais, he relinquished his ecclesiastical condition; and henceforth appears chiefly in a military character. He was one of the first to give in his allegiance to Henry IV., in whose cause he fought with distinguished gallantry at Arques, at Ivry, and at Fontaine Françoise. After the termination of the war, however, he was charged with having been concerned both in the conspiracy of the Marshal de Biron, in 1602, and in that fomented in 1604 by the Marchioness de Verneuil, Henry's mistress, who was his half-sister, being a daughter of Marie Touchet; for this offence he was sentenced to death, but the sentence was commuted to imprisonment. In 1606, the possessions which had been left him by Catherine de' Medicis were taken from him by a decree of the parliament, and bestowed upon the Dauphin, afterwards Louis XIII. In 1616, however, he was released by that king from his long imprisonment; and in 1619 he was made Duc d'Angoulême. He was also appointed general of the light dragoons of France, and in 1620 was sent on a special embassy to the court of the emperor, Ferdinand II. He afterwards resumed his military career, and, in 1628, commenced the famous siege of Rochelle. After this he served for some years in Languedoc, Germany, and Flanders, in the war against the house of Austria, which occupied the last years of Louis XIII. and the commencement of the reign of his successor. He died at Paris, on the 24th of September, 1650. The following works by the Duke of Angoulême were published during his life: 'Les Harangues prononcées en l'Assemblée des MM. les Princes Protestants d'Allemagne, par le Duc d'Angoulême,' octavo, 1620; 'La Générale et Fidèle Relation de tout ce qui c'est passé en l'Ile de Ré, envoyée par le Roi à la Reyne sa Mère,' octavo, 1627; and 'Relation de l'Origine et Succès des Scherifs, et de l'Etat des Royaumes de Maroc, de Fez, et Tamdant, écrit en Espagnol par Diego de Torrès, et traduit par M. C. D. V. D'A.' (M. Charles de Valois d'Angoulême), quarto, Paris, 1636. The Duc d'Angoulême was married, first, on the 6th of March, 1591, to Charlotte, daughter of the constable of France, Henry de Montmorenci; and, secondly, on the 25th of February, 1644, to Françoise de Nargonne, who survived him many years, dying on August 10, 1715, at the age of ninety-two.

ANGOULÊME, DUC D'. [CHARLES X.]

ANGOUMOIS, a district which formed one of the thirty-three provinces into which France was divided before the revolution in 1789. It is now included in the department of CHARENTE.

ANGRA, the capital of Terceira, and of the whole group of the Azores, is on the south coast of the island, 38° 38′ N. lat., 26° 15′ W. long. Angra stands on an inlet, from which it derives its name, *angra*, in Portuguese, meaning an 'inlet.' Angra has always been the residence of the governor; it is also an episcopal town, and contains a cathedral, five parish churches, a military college, and an arsenal. It is fortified and defended by a castle. It is the residence of French, English, and Dutch consuls, and has a considerable trade. The population is 13,000.

The fortifications were greatly augmented during the regency, which resided in Angra from 1830 till the capture of Oporto and Lisbon by Don Pedro. [TERCEIRA.]

ANGUILLA. [ANTILLES.]

ANGUISCIOLA, SOFONISBA, distinguished as the 'Cremonese' for her ability in portrait-painting. She was born in Cremona, about 1533, and learned painting first of Bernardino Campi at Cremona, and afterwards of Bernardino Gatti at Milan. Vasari describes some of her portraits as wonderful. Philip II. of Spain invited her to enter into the service of his queen. In this employment at Madrid she painted many portraits, and received munificent rewards from her royal patron. In the latter part of her life she resided at Genoa, with her second husband. Here she painted many pictures, by which she added to her reputation; but as she grew old she became blind. She however did not lose her cheerfulness of mind, but became the centre of an intellectual society. Vandyck frequently visited her. She is generally supposed to have died in 1620.

There are several portraits of Sofonisba by her own hand: in one at Althorp in Northamptonshire she is represented playing upon a harpsichord.

ANGULAR SECTIONS. [TRISECTION; TRIGONOMETRY.]

ANGULAR VELOCITY. [VELOCITY.]

ANHALT, an ancient principality in the north of Germany, lies between 51° 35′ and 52° 6′ N. lat., and 11° 38′ and 12° 34′ E. long.: it is bounded N. by Brandenburg, E. and S. by Prussian Saxony, S.W. by the earldom of Mansfeld, and N.W. by Brunswick and Magdeburg. It is watered by the Elbe, which flows through it from E. to W., and by its tributaries, the Mulde and Saale. It produces corn, fruit, flax, hemp, tobacco, timber, silver, copper, iron, and coal; rears a considerable quantity of cattle and sheep; and contains a population of 133,000, of whom upwards of 130,000 are Protestants, both prince and people having embraced the Reformation, and dissolved their monastic institutions, between the years 1521 and 1532. Anhalt is divided into three duchies, Bernburg, Coethen, and Dessau, which contain 19 towns, 4 villages with markets, and 249 other villages. The chief towns are—Dessau, with a population of 10,000; Zerbst 8000; Coethen 6500; and Bernburg 5800. The form of government is monarchical, and the sanction of its diets is required to the imposition of taxes, though the fundamental laws rest on the various ordinances promulgated by its princes. The ancestral seat of the princes of Anhalt was the stronghold of Anhalt, on the Hartz, which is said to have been built in 940. Its only remains, at the present day, are the crumbling fragments of some of its vaults. Upon the death of Prince Joachim in 1586 (the inheritance of the several branches of the House of Anhalt having been united in his person), his four sons divided the principality between them; and thence arose the respective sovereignties of Dessau, Bernburg, Zerbst, and Coethen. The third of these became extinct in 1793, and was shared in equal portions among the three surviving branches. Their erection into duchies is of recent date; the prince of Bernburg having been created duke in 1806, and the princes of Dessau and Coethen having been raised to the same dignity in the following year.

ANHOLT is a small Danish island in the Kattegat, 56° 38′ N. lat., 11° 35′ E. long.

ANHYDRITE, a crystal having a right rhombic prismatic form; a colour varying from light blue to light red; a translucent texture; and a vitreous lustre. It consists of—sulphuric acid, 57; lime, 42; silica, 2.

ANIELLO, TOMMASO, called by corruption MASANIELLO, a young fisherman, and a native of Amalfi, lived at Naples towards the middle of the seventeenth century, under the government of the Duke d'Arcos, viceroy of Philip IV. of Spain. Naples was then suffering all the evils of delegated absolute power; its treasures went to Spain, its youth were sent to fill up the ranks of the Spanish army, and both were wasted in ruinous wars for the ambition and selfish views of a distant court. In the year 1647, the Duke d'Arcos, in order to defray the expenses of a war against France, thought, as a last expedient, to levy a tax on fruit and vegetables, the common articles of food of the Neapolitan people. The edict which announced this fresh impost occasioned the greatest ferment, especially among the poorer classes of inhabitants. An old priest of the name of Genoino, who had been in prison for some former offence, contributed to inflame the general discontent. Masaniello, who was then about twenty-five years of age, and who, by his humour and natural quickness, was a great favourite among the people of the *mercato*, the great market-place of Naples, spoke loud among his friends against the new tax. His wife had been arrested some time before at the gates of the city, as she was trying to smuggle in some flour, which, like every thing else, was a taxed article. She was kept in prison several days, and her husband had to pay in order to obtain her release. Masaniello had, accordingly, as we might expect, conceived a violent hatred against the Spanish government.

Masaniello was at the head of a troop of young men who were preparing for the great festival of our Lady of the Carmel, by exhibiting sham combats, and a mock attack on a wooden castle. On the 7th of July, 1647, he and his juvenile troop were standing in the market-place, where, in consequence of the obnoxious tax, but few countrymen had come with the produce of their gardens. The people looked sullen and dissatisfied. A dispute arose between a countryman and a customer who had bought some figs, as to which of the two was to bear the burden of the tax, and this led to a riot against the municipal authorities. Masaniello then addressed the people around him in a speech of coarse but fiery eloquence. He described their common grievances and miseries, and pointed out the necessity of putting a stop to the oppression and avarice of their rulers. 'The Neapolitan people,' said he, 'must pay no more taxes!' The people cried out, 'Let Masaniello be our chief!' The crowd now set itself in motion, with Masaniello at their head; it rolled onward, increasing its numbers at every step. The few Spanish and German troops of the viceroy were defeated, and obliged to defend themselves within the castles. The viceroy in this extremity proposed Cardinal Filomarino, the archbishop of Naples, who was a man of abilities, and withal popular, to act as mediator between him and the people. Articles were drawn up under Masaniello's direction, by which all imposts upon articles of consumption were abolished, and the privileges granted by Charles V. restored, besides an amnesty to all concerned in the insurrection. The Duke d'Arcos, after signing the treaty, put a gold chain round Masaniello's neck, and saluted him as Duke of St. George. Masaniello returned in triumph to his humble dwelling, and peace was momentarily restored.

But Masaniello's mind began to exhibit symptoms of derangement. His sudden and giddy elevation, the multiplicity of questions referred to him,

his total inexperience of business, the heat of the season, and want of sleep—all helped to derange his intellects. He became suspicious, capricious, absurd, and even cruel; and at length, after committing many extravagances, on the 16th of July, was evidently insane. He on that day escaped from his friends, and addressed the people in the church del Carmine in a discourse, at first affecting, but at length wild and incoherent. Masaniello was taken down from the pulpit by the priests, the archbishop spoke to him kindly, and advised him to rest and calm himself awhile in the adjoining convent. He was taken into one of the cells, where a change of clothes was given him, and he lay down on a couch and rested a few minutes. Armed men soon appeared at the cell-door. Masaniello turned towards them: 'Here I am—do my people want me?' A discharge from their arquebuses was the answer of the wretches; and Masaniello fell, exclaiming, 'Ungrateful traitors!' and expired. His head was cut off, fixed on a pole, and carried to the viceroy, the body dragged through the streets by a troop of boys, as he had himself foretold a few days before, and then thrown into a ditch. The revolt, however, was not yet quelled: the people, after appointing the Prince of Massa for their chief, whom they soon after murdered, chose Gennaro Annese, one of the villains who had plotted against Masaniello's life. This chief was soon superseded by the Duke of Guise, who came to try his fortune at Naples as the representative of the ancient house of Anjou. [GUISE.]

ANIMAL. There are two great groups or kingdoms of organic bodies upon our globe. There is life on and in the land, on and in the water, and through the expanse of atmosphere. Life teems around us: here it assumes the most gigantic forms—there, the most powerful microscope is requisite to assure us of its tangible presence. We cannot contemplate *life* as an abstract idea, we cannot dissociate it from *matter* under certain forms and certain modes of composition,—and to bodies exhibiting these forms and these modes we assign the term *organic*. The phenomena manifested by organic bodies, the result of an innate power in the body itself, collectively make up our ideas of *life*. We sometimes talk of a *vital principle*, but the expression is calculated only to cover our ignorance respecting the ultimate cause of the phenomena uniformly exhibited by all living beings. This principle is a mystery—an animal or a plant develops itself from its embryo condition to maturity; its development supposes the reception and assimilation of external matters, the throwing away of useless or effete matters, a constant change of particles; growth up to a certain point, and then, as if the living machinery wore itself out in the working—decline, and death, but why so? we cannot tell; but this we know, that after death the elements which compose the body, and which were combined into one harmonious whole contrary to the laws of chemistry, are now freed from their mystic governance,—they separate—they return to the earth and the atmosphere; and the once living body is dissolved. All organic bodies propagate their species respectively; the idea of spontaneous generation, as it is termed, is absurd; no combination of material particles can produce an organic being; but light, heat, and other influencing causes may and do excite the development of dormant germs; but those germs had parents—they sprung not from a fortuitous concurrence of atoms, but were the results of a law impressed upon all organic beings. We do not mean however to say that creation may not be going on; the great power which called all creatures into existence, can and may call up from time to time other races, according to a vast scheme beyond the comprehension of our minds; but granting this, the theory of spontaneous generation is not the less absurd; it proceeds upon the idea of chance, not design; and strange to say, a chance which results invariably in fitness and harmony. Of that theory which supposes all living creatures to be mere variations of one primitive typical form; a monad, mystically transformed from one stage of development to another, till *man* arises as the ultimate, we shall say nothing. Why re-criticise Lamarck, whose wild speculations have made but few converts.

All organic beings are divided into two great kingdoms, namely, the *animal* and the *vegetable*. The distinction between vegetables and the higher races of animals is marked and obvious; animals are endowed with sensation and the power of voluntary motion, implying the possession of a nervous system, and of muscles; some plants indeed shrink when touched; fold up their flowers on the approach of unfavourable weather, or turn towards the sun, as that luminary passes from east to west; but this irritability is not connected with perception or volition, the leaves cannot choose whether they shall shrink or not; neither can the plant move itself from the spot to which it is rooted. But though these observations apply very extensively, they are not universal, for when we come to the lower links in the chain of the animal creation, we find many as incapable as plants of removing from the spot in which they are fixed, while in their composition no trace of nerves can be detected. These animals are indeed simple in their structure; yet though many are fixed, they are not rooted; they do not absorb nutriment through roots, they have an internal digestive cavity for the reception of food in which it undergoes certain changes; and they have the means of acquiring that food, which must undergo the process of digestion before it can be assimilated. An internal digestive cavity, varying indeed in form and appendages, is one great distinctive characteristic of animals; and it is from this cavity that the nutrient particles are thrown into the general system. In vegetables there is no such cavity; the absorbing vessels of nutrition in plants arise on the surface, and at once take up the fluids, or natural particles prepared for them in the atmosphere and the soil. The essential elements of all organized matter appear to be carbon, oxygen, hydrogen, and azote; the solid parts of plants, termed the woody fibres, contain carbon, oxygen, and hydrogen, but no azote or merely a trace of it. The solid

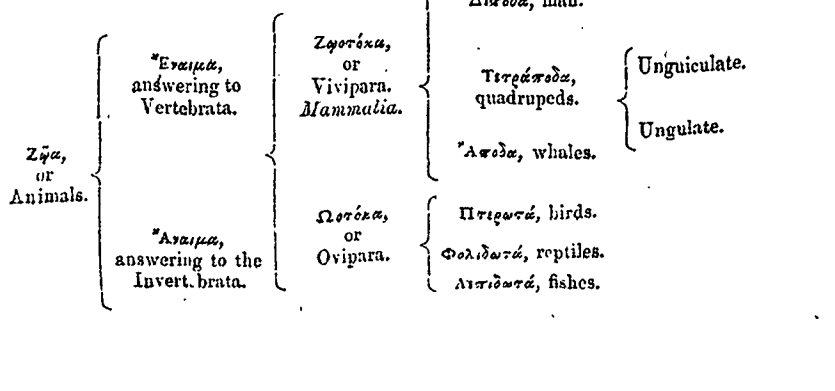
parts of animals consist of lime or magnesia, united with carbonic or phosphoric acids; but in animals destitute of these parts, their soft gelatinous substance abounds with azote, which does not enter into the composition of the gum or mucilage of plants; azote is an essential element in animal bodies, but is only accidental in vegetables. The difference of the composition of animal and vegetable matters may be distinguished by the peculiar odour exhaled by each on burning. Moreover, as vegetables abound in oxygen, they have after death a tendency to become acid, by its new combinations with carbon and hydrogen; on the contrary, the soft parts of animals after death are disposed to become alkaline; the azote entering into new combinations with the hydrogen, and forming ammonia. The principal function of vegetable life is the exhalation of oxygen, which is performed through the action of light upon the leaves, while hydrogen and carbon are preserved; the air consists of oxygen, azote, and carbonic acid (a combination of oxygen and carbon). Water is composed of oxygen and hydrogen, and these are presented by the soil and the atmosphere. The great function of animal life is the expulsion of superfluous hydrogen, and especially of carbon, by the agency of the oxygen of the atmosphere or of the water, which combines with the hydrogen and with the carbon of the vital fluid, and these are exhaled under the forms of water and of carbonic acid. 'The relations of vegetables and of animals to the atmosphere,' says Cuvier, 'are inverse. The former consume water and carbonic acid, the latter reproduce them. Respiration is the essential function in the constitution of an animal body; it is that which in a certain sense animalizes it, and we shall find that animals exercise the more completely their animal functions in proportion as they enjoy a more perfect respiration.'

Animals then are distinguished from plants by the powers of sensation or perception, of voluntary motion, by the possession of a true internal digestive cavity; by an element in their chemical composition termed azote, and by the exhalation of carbonic acid in order to free the system from carbon. To this we may add that animals are destined (as a general rule) to fulfil more numerous and varied functions than plants; consequently they have their structure far more complicated, and are furnished with organs, as muscles, nerves, &c., which are wanting in vegetable organization. Even where nerves are not distinguished, there is reason to believe that the nervous matter, instead of being concentrated into threads, is diffused throughout the general substance. Such is a brief outline of the distinctive characteristics of animal and vegetable bodies, to the former of which our attention is now directed. The science which teaches the nature and the classification of animals is termed zoology (ζῷον, an animal, and λόγος, a discourse), and this science is based upon comparative anatomy. No arrangement, no classification, which is not founded upon the details of structure and organization can claim to be called natural; but when we consider the extent and boundless diversity of the animal kingdom, we may readily imagine that the most elaborate *systema naturæ* will have, as science progresses, to be enlarged and corrected from time to time, generations adding to the stores of knowledge left by their predecessors.

In a crude form, zoology must have been one of the earliest departments of science which forced itself on the attention of mankind. The necessity of taming wild animals, so valuable in a state of domestication, of selecting from the unreclaimed such as were fit for food, and of naming them according to their more marked peculiarities and habits, supposes a study of them. The savage, the powerful, and the noxious would intrude themselves on attention, the graceful and the beautiful would court notice, nor would the small and timid altogether elude observation.

In the scriptural records, we read of domesticated sheep and oxen in far-gone primeval times, and we have scattered passages which prove that zoology, a study 'of beasts and of fowls, and of creeping things, and of fishes,' was not unattended to. The delineations of animals on the monuments of ancient Egypt prove that great attention was paid to the subject, and this the more, that some were deemed sacred, and revered accordingly. It is probable, however, that no attempts at system in our acceptation of the term were made; a general arrangement of animals into beasts, birds, fishes and creeping things, was probably made; and the carnivorous would be discriminated from the herbivorous.

Aristotle ('History of Animals') appears to have been the first who attempted a scientific generalization of the groups of animals, and his method was founded on organic structure, for he made anatomy subservient to the science of zoology. His leading divisions (Book 1) are as follows:—



These primary divisions are followed out with great minuteness and with wonderful accuracy, which attest the author's extensive researches, and his powers of generalization.

Subsequent writers, as Ælian, Pliny, and others, need no comment; they were mere compilers; nor was anything of real importance attempted by way of advancing zoology as a science, until our countryman Ray gave to the world his zoological arrangement, which served as a guide to Linnæus in his 'Systema Naturæ.' Buffon, the contemporary of Linnæus, aided zoology by treating the subjects he described in a style of captivating eloquence, irrespective of any definite system; he threw an air of grace around the science, and rendered all its details interesting; but Linnæus aimed at the establishment of order and system. He selected the circulatory apparatus as the foundation of his arrangement, and divided the animal kingdom into three great sections, thus characterized:—

I. Animals possessing warm red blood, and a heart composed of four compartments, viz. two auricles and two ventricles. Examples, *mammalia* and *birds*.

II. Animals with cold red blood, the heart consisting (as he believed erroneously) of one auricle and one ventricle. Examples, *reptiles* and *fishes*.

III. Animals possessing cold white sanies, and not blood, the heart consisting of a single cavity, which he designates an auricle. To this section he assigns *insecta*, including *crustacea*, and the lower invertebrate animals, which he terms *vermes*.

The arrangement of Linnæus, though not without its great value, is confessedly defective. He was unfortunate in his selection of the circulatory apparatus as his foundation, which is a system only of secondary importance in the animal economy, and is besides too variable to become the basis of zoological arrangement, while other and important parts of organic structure, such as the condition of the brain and nervous system, were overlooked. The arrangement of Linnæus, more or less modified, long continued to influence the views of zoologists, till the appearance of the 'Règne Animal distribué d'après son Organization,' by Cuvier, formed the commencement of a new era in the annals of the science. Cuvier professedly takes anatomy as his guide; the basis of his system is organization; and upon this principle he divides the animal kingdom into four great sections or classes, *Vertebrata*, *Mollusca*, *Articulata*, and *Radiata*.

The first class, *Vertebrata*, is so called from the possession of a vertebral column inclosing a spinal cord, and embraces mammalia, birds, reptiles, including amphibia and fishes.

The second, *Mollusca*, derives its title from external characters or appearances; viz. the softness of the structure of the animals it embraces (*mollis*, soft), but its characters are taken from the condition of the nervous system, which consists of ganglia diversely arranged and united by nervous threads. There is no true internal skeleton. Of the senses, that of taste seems to be generally possessed; a few possess the organs of sight, and one family those of hearing. Many groups are protected by univalve or bivalve shells. Cuvier divides the mollusca into six sections, viz. *Cephalopoda*, or cuttle fishes, nautili, &c.; *Pteropoda*, as the clio borealis; *Gasteropoda*, as slugs, and univalve snails terrestrial and aquatic; *Acephala*, bivalve mollusks, as oysters, muscles, &c.; *Brachipoda*, shelled mollusks with arm-like appendages, as lingula, terebratula; *Cirrhopoda*, as barnacles, balani, &c.

The third, *Articulata*, derives its title from external form, but its characters from internal structure. The nervous system consists of two long threads, uniting ganglia regularly disposed, whence nerves are given off to the various organs; a nervous circle surrounds the œsophagus, where the first ganglion is placed, the analogue of a brain. The trunk is divided into segments, sometimes invested in a soft, sometimes in a hard integument, to which the muscles are internally attached; limbs variable, or wanting; senses variable. The articulata are divided into four groups or classes; *Annelida*, or red-blooded worms, as the earth-worm, the leech, the lug-worm, &c. destitute of limbs; *Crustacea*, lobsters, crabs, shrimps, &c.; *Arachnida*, spiders, scorpions; *Insecta*, myriapods, and all insects.

The fourth section, *Radiata*, includes all the lower animals called zoophytes, &c. Cuvier divides them into *Echinodermata*, as asterias or sea stars, sea urchins, &c.; *Entozoa*, or internal parasitic worms, as filaria, ascaris, &c.; *Acalephæ*, as medusæ, physalia, &c.; *Polypifera*, as polypes, zoophites, corals, madrepores, &c.; and *Infusoria*, or animalcules, as rotifera, monas, volvox, &c. In this section, *Radiata*, Cuvier is less successful than in the three former: the groups it includes have few characters in common; they form an heterogeneous assemblage of animals of very different structure—such, for example, as the echinus and other allied forms, and corals and madrepores. We say this without any intention of detracting from the merits of Cuvier; he opened the way in the right direction; he made extraordinary advances; and if succeeding zoologists have reduced the chaotic assemblage of Radiata to something like order, it is by following in his track. He demonstrated the all-importance of the nervous system in the scheme of the animal creation, for it is with this that the sensation, the volition, the general structure and powers of animals are inseparably connected. The higher the condition of the nervous system the higher will the being be in the scale of creation—the more completely will it be developed in all its organization.

The following arrangement of the great groups of the *animal kingdom*, a modification of that of Cuvier's, is very generally adopted in England.

Sub-Kingdom 1.—*Acrita* (Macleay) from α, privative, κρινω, to separate. Part of Cuvier's *Radiata*. In this sub-kingdom are included *Porifera*, or sponges; *Polypifera*, as polype-bearing corals; *Polygastrica*, polygastic animalcules; *Acalephæ*, sea nettles; *Sterelmintha*, parenchymatous parasitic worms.

The *Acrita*, with the exception of certain

worms or parasites, are all aquatic, and though they present us with varied forms, all consist essentially of a gelatinous, and, as it appears, homogeneous substance, of which the solid constituents bear but a trifling proportion to the fluid. This gelatine is sometimes unsupported by any kind of framework; in other cases it invests, or on the contrary is contained in, a horny or calcareous support, its own secretion, and offering great variety of form. In the substance of these animals no nerves have been detected, but nervous molecules are most probably blended with it. No true vessels appear to exist, yet in some, canals are excavated in the substance, through which fluids absorbed by filaments or prolongations circulate and are carried to a central cavity. This apparatus is at once a respiratory and digestive apparatus; for though no lacteals or tubes of nutrition can be found, still the absorption of nutritive matter undoubtedly takes place. In some, indeed, a more complex and perfect alimentary and aërating set of organs is present, and their use cannot be mistaken. In most no distinct muscles are to be perceived; many however contract and expand their bodies and tentacles, and by means of the latter seize their prey. Many are capable of locomotion; but others are fixed like the plant to one spot for life. Some secrete a fluid of a very irritating quality, which produces great pain when brought into contact with the hand; hence the name *Acalephæ*, or sea nettles, as the Physalus, or Portuguese Man-of-War. There is no sexual distinction, and reproduction takes place either by simple division, by granular ova, or by gemmules, which becoming in due time detached, ultimately assume the form of the parent bodies. In many instances the *Acrita* form compound animals. Numbers united together by a vital conglomeration constitute one animal, if we regard it in some points of structure; but many, if we regard it in others. Such are the Zoophytes and corals (*Polypifera*). Of all the acrita the sponges are the lowest in the chain; and few that look at a piece of sponge regard it as a frame for the support of a living gelatinous film. Such are the general characters of the *Acrita*.

Sub-Kingdom 2.—*Nematoneura* (Owen), from νῆμα, a thread, νεῦρον, a nerve. (Part of Cuvier's *Radiata*.) This sub-kingdom contains the *Bryozoa*, moss corals, or polypes with ciliated arms; *Rotifera*, or wheel-like animalcules; *Epizoa*, certain external parasites; *Cœlelmintha*, or cavitary internal parasitic worms; and *Echinodermata*, as sea-stars, sea-urchins, &c.

The groups above enumerated, though agreeing in certain structural points, differ materially from each other in general economy and external characters, insomuch that with the exception of the *Echinodermata*, they seem rather to belong to certain families of the Acrita, with which indeed they have been united.

Cuvier indeed places the cavitary intestinal worms (*cœlelmintha*), in the group termed by him 'les entestinaux,' regarding them as constituting only a subdivision, which includes the Epizoa also. The *Bryozoa*, under the title of 'Polypes à Cellules,' are placed with the *Polypifera*. The *Rotifera* constitutes Cuvier's first order of infusory animalcules; while the *Echinodermata* constitute the first class of zoophytes. Nevertheless, we find in these groups of the sub-kingdom *Nematoneura* a higher grade of organization than in those of *Acrita*: nerves appear in the form of distinct filaments, and also fasciculi of muscular fibres; there is an alimentary tube separated from the parietes of the body and contained in an abdominal cavity, and generally the injestive and the ejestive orifices are distinct. There is also a circulatory system distinct from the digestive, by means of which the nutritive fluids permeate the body. The fissiparous mode of reproduction, that is by spontaneous division, is no longer witnessed: the *Bryozoa* appear indeed to be gemmiparous, but the rest are oviparous.

Sub-kingdom 3.—*Homogangliata* (Owen); *Annulosa* (Macleay); *Diplonewra* in part (Grant). This sub-kingdom is equivalent to the *Articulata* of Cuvier, excepting that most zoologists assign to it the *Cirripeda* or *Cirrhopoda* (barnacles and balani), which Cuvier places among his *Mollusca*. It comprises, therefore, *Cirripeda*, *Annelida*, *Myriopoda*, *Insecta*, *Arachnida*, and *Crustacea*. The title proposed by Professor Owen is in allusion to the nervous system, which consists of a series of ganglia symmetrically arranged along the ventral region of the body in pairs, and united by intervening nervous filaments, so as to form a continuous chain. The first, or interior pair of ganglia, however, form an exception, as far as position is concerned, to the rest, being placed on the dorsal aspect of the body, and embracing by means of a filament the œsophagus or gullet.

Sub-Kingdom 4.—*Heterogangliata* (Owen), from ἕτερος, other, and γαγγλίον, the knot of a nerve; *Cyclogangliata* (Grant). This sub-kingdom is equivalent to the *Mollusca* of Cuvier. It embraces the *slugs*, the *conchiferous* and *tunicate mollusks*, and the *cuttle-fishes*. The nervous system consists of ganglia disposed in different points, one principal ganglia being situated on the œsophagus, which it encircles with a nervous thread. The want of symmetry in the distribution of the ganglia, or nervous centres, is in accordance with the absence of symmetry observable in the external configuration, as well as with the variable arrangement of the internal viscera. The ganglia are connected together by means of nervous filaments, and branches are distributed over the viscera and organs of locomotion. The circulation is always double, or, in other words, there is a systemic as well as pulmonic or branchial circulation. This function is assisted by an aortic ventricle, to which the blood is returned by veins from the aërating apparatus, which first conduct to an auricle. In the cephalopods there is a pulmonic as well as aortic ventricle, and the pulmonic ventricle is even divided into two. The blood is a pale sanies. With respect to the digestive apparatus, there is a true alimentary canal, generally salivary glands, and always a liver.

Sub-Kingdom 5.—*Vertebrata* (Cuvier); *Myelencephala* (Owen); *Spinicerebrata* (Grant). Under this head are ranged *Fishes*, *Reptiles*, including

Amphibia, Birds, and *Mammalia*, all animals with a brain and spinal cord lodged in a skull and vertebral column, the centre of the nervous system, with a pulmonic and systemic circulation, the blood being red; with a true digestive or alimentary canal; with a form disposed symmetrically; and with organs of sight, hearing, smell, and taste.

From this sketch of the system of Cuvier, and its modification by eminent naturalists, who have pursued in the same track, taking anatomy as their guiding star, we may proceed to notice a system termed the *Quinary*, first brought forward by Mr. W. S. Macleay, (see his 'Horæ Entomologicæ,' his 'Annulosa Javanica,' and his 'Comparative Anatomy of certain Birds of Cuba,' in 'Linn. Trans.' vol. xvi.), and afterwards adopted by Mr. Vigors, and (with certain modifications) by Mr. Swainson, and other naturalists. This system is called *Quinary* because its advocates consider that every natural group consists of two typical, or normal, and three aberrant forms. The normal forms are those which exhibit the aggregate characters of the general group in their maximum of development; the aberrant groups exhibit these characters less decidedly, and indicate in modification of form and habits an affinity to other groups; they are the passage by which any given group blends into those contiguous to it; and this blending of form into form, or of group into group, constitutes a series of links uniting the groups together at three separate points. Each natural group, moreover, forms a circle, returning into itself, but linked by points of inosculation to others. Hence it is sometimes termed the *circular* system, because it is based upon the principle that every natural group forms a circle; or, in other words, that proceeding from a given point, we follow a series of gradations returning to that point again; that each circle impinges upon or inosculates at certain points with the like parts of other circles in approximation to it—so that every class is made up of a harmonious constellation of circles forming one vast zone: this zone assisting with that of other classes to complete one mightier still—the zone of the animal kingdom. Thus it professes to follow out the harmonies and affinities of nature, to unravel her perplexities, and to interpret her hieroglyphics. The advocates of this system contend, moreover, that every circle has its analogies in the contents of other circles: that is, the forms of one circle have their representatives in those of another circle. The following is a series of the orders of mammalia, according to Mr. Macleay, adapted analogically to those of birds as arranged by Mr. Vigors:—

MAMMALIA.		BIRDS.
1. *Feræ*, carnivorous. .	Represented by	*Raptores*, birds of prey.
2. *Primates*, omnivorous		*Insessores*, perching birds.
3. *Glires*, frugivorous .		*Rasores*, ground birds.
4. *Ungulata*, frequenting the vicinity of water		*Grallatores*, wading birds.
5. *Cetacea*, aquatic . .		*Natatores*, aquatic birds.

Mr. Swainson thus sums up his circular theory:—

1st. Every natural series of beings in its progress from a given point either actually returns or evinces a tendency to return again to that point, thereby forming a circle.

2ndly. The contents of such a circle or group are *symbolically represented* by the contents of all the other circles in the same class of animals, this resemblance being strong or remote in proportion to the proximity or the distance of the groups compared.

3rdly. The primary divisions of every natural group are three (not five as Mr. Macleay says), each of which forms its *own circle*; these are, one typical, one sub-typical, and one aberrant. Mr. Swainson, moreover, advocates the direct union of typical groups, without the intervention of aberrant groups, which the founders of the quinary system do not admit, and, strange to say, he excludes man from the pale of the animal kingdom.

It is not here our province to advocate or condemn either of these systems, the leading points of which we have just stated, though in England they have wanted neither supporters nor opponents. On the continent the circular system never found favour, and it has now few followers in this country.

The rapid strides which the science of zoology has made, both in our island and on the continent, within the last few years, proves the number, zeal, and talents of its professed cultivators; and the works published on the subject, some elaborate and expensive, some of a more popular character, indicate the general interest taken in it. New discoveries are constantly being made, not only of beings extant upon the earth, but of beings whose fossil relics alone remain to attest their having lived and moved upon other continents, and in other seas, than those into which our globe is now divided.

The various classes, orders, families, genera, and species of animals are duly characterized, and their respective situations in the scale of the animal kingdom clearly explained in their proper places. Our aim in this article is to give a distinct outline of the characters and leading divisions of the animal kingdom: these divisions are further discussed under their respective heads; and when individual species are described, their habits and peculiarities, no less than their zoological relationships, are accurately displayed.

ANIMAL CHARCOAL. [CHARCOAL, ANIMAL.]

ANIMAL FLOWERS. [ACTINIA.]

ANIMAL MAGNETISM, a theoretical agent of a peculiar nature, supposed to be capable, in some mysterious mode, of producing the most powerful effects on the human body.

It was in the year 1734 that Mersburg in Swabia gave birth to Anton Mesmer, the discoverer of the supposed influence of magnetism. This celebrated man studied physic at Vienna, and took his degree of doctor of medicine in the university of that place, in the year 1776. On that occasion he published an inaugural thesis 'On the

Influence of the Planets on the Human Body.' Whilst at Vienna he became acquainted with a jesuit, Father Hehl, who had great faith in the influence of the loadstone on human diseases, and had invented steel plates of a peculiar form which he impregnated with the virtues of the magnet, and applied to the cure of diseases 'with extraordinary success.' From him Mesmer learned the art of using the magnet in the cure of disease, and having left Vienna, and travelled some time in different parts of Germany and Switzerland, continuing everywhere to work wonderful cures, at last he set out for Paris, where he arrived in the year 1778. Here his success was very great in curing diseases, and a society was actually formed for the purpose of purchasing his secret. The influence produced on the patient by Mesmer's magnets, or by his own imagination, was undoubtedly very great, and although at first the subject was not inquired into in England, it was much cultivated on the continent.

One of the first publications in this country on this subject was by Mr. Richard Chenevix, a fellow of the Royal Society, who published a series of papers in the 'London Medical and Physical Journal' for 1829, entitled 'On Mesmerism, improperly denominated Animal Magnetism.' He performed numerous experiments, which were witnessed by many medical men, and amongst others by Dr. Elliotson. In 1836 Mr. Colquhoun published a work on animal magnetism, entitled 'Isis Revelata,' which attracted considerable attention to the subject, and contained as an appendix a translation of a report of a second French commission appointed to investigate this subject in 1831. This was followed by the arrival of Baron Dupotet in London, who performed many experiments, some of which were witnessed by Dr. Elliotson, who immediately undertook the further investigation of the subject. The result of the experiments of Dr. Elliotson, which were published in the 'Lancet,' produced a great sensation, and phenomena which had hitherto been regarded as impossible were constantly produced. Communications were also made at this time to various medical journals of remarkable cases, and among others were some from Mr. Herbert Mayo, then professor of physiology at King's College, London. In 1840 a work was published by the Rev. Chauncy Hare Townshend, entitled 'Tracts on Mesmerism, with Reasons for a dispassionate Inquiry into it.' This work contained many cases and facts with regard to the phenomena of animal magnetism. In 1841 M. La Fontaine, a Frenchman, visited England, and commenced giving public lectures on mesmerism and exhibitions of its phenomena. Whilst in Manchester he attracted the attention of Mr. Braid, a surgeon residing there, who, having repeated and modified variously the original experiments of the mesmerisers, published a work on the subject in 1843, entitled 'Neurypnology, or the Rationale of the Nervous Sleep.' Since this time various public lecturers have appeared, and have created a general interest on the subject.

The phenomena presented by persons under the influence of animal magnetism are various, as well as the modes by which the phenomena are produced. Mesmer and his followers on the continent, and most of those who have practised mesmerism in this country, have produced its effects by placing themselves near to the individual to be mesmerised, and making downward passes with their hands over their bodies without touching them, but looking at them at the same time intently in the face. This is found to affect the individual in a space of time varying from two or three minutes to half an hour. All persons are not, however, susceptible of the influence, and if an effect is not produced in the course of half an hour, the effort is abandoned. Mr. Braid, however, in the course of his inquiries, has found that a second individual was not necessary to the successful development of mesmeric phenomena, and that by causing a person to sit still, and simply directing his attention, by means of the eyesight, to some particular object, as a lancet-case or a cork, all the effects of the passes and intense looking of the operator could be produced. This induced him to give another name, Hypnotism, to the state in which persons are thus placed.

The effects of the passes or fixed attention on persons of nervous susceptibility are various. Writers on animal magnetism distinguish many stages. The following classification is by Kluge, a German writer on the subject, and gives a tolerably correct estimate of the effects which have been observed in mesmerised individuals:—

First degree,—called Waking, presents no very remarkable phenomena. The intellect and the senses still retain their usual powers and susceptibility.

Second degree:—Half-sleep, or imperfect crisis. Most of the senses still remain in a state of activity, that of vision only being impaired, the eye withdrawing itself from the power of the will.

Third degree:—The magnetic or mesmeric sleep. The organs of the senses refuse to perform their respective functions, and the patient is in an unconscious state.

Fourth degree:—The perfect crisis, or simple somnambulism. In this stage the patient is said to 'wake within himself,' and his consciousness returns. He is in a state which can neither be called sleeping nor waking, but which appears to be something between the two.

Fifth degree:—Lucidity, or lucid vision. This is called in France, and mostly in this country, *Clairvoyance;* in Germany, *Hellsehen.* In this state the patient is said to obtain a clear knowledge of his own internal mental and bodily state, is enabled to calculate with accuracy the phenomena of disease which will naturally and inevitably occur, and to determine what are their most appropriate and effectual remedies. He is also said to possess the same faculty of internal inspection with regard to other persons who have been placed in mesmeric connection (*en rapport*) with him.

Sixth degree:—Universal lucidity; in German, *Allgemeine Klarheit.* In this state the lucid vision becomes greatly increased, and extends to objects whether near or at a distance.

Such are the states of the system recognised by

mesmerists, and works on the subject abound with cases illustrative of each of these six degrees. However, there are many who practise mesmerism who are sceptical with regard to the real existence of the two last degrees, although such cases are recorded by the best authorities on animal magnetism.

Many theories have been propounded in order to embrace the facts of animal magnetism. Mesmer and his immediate followers attributed them to the action of a subtle fluid in the bodies of animals, which enabled them to exercise an influence on each other at a distance, just as a magnet affects iron; hence he called it animal magnetism. This hypothesis of a nervous fluid susceptible of being influenced and producing an influence more or less modified, has been adopted by most writers on mesmerism till the appearance of Mr. Braid's experiments. The mesmeric state having been produced by Mr. Braid without any influence from a second person, he accounts for the phenomena by supposing that there is 'a derangement of the cerebro-spinal centres and of the circulatory and respiratory and muscular systems, induced by a fixed state, absolute repose of body, fixed attention, and suppressed respiration, concomitant with that fixity of attention.' He further adds, that in all cases he believes 'that the whole depended on the physical and psychical condition of the patient, arising from the causes referred to, and not at all on the volition or passes of the operator throwing out a magnetic fluid or exciting into activity some mystical universal fluid or medium.'

(Elliotson, *Human Physiology*, 5th edition; Lang, *Mesmerism, its History, Phenomena, and Practice;* the *Athenæum* for December, 1844; and the *Zoöist*, a monthly journal which advocates Animal Magnetism.)

ANIMAL PHYSIOLOGY. [PHYSIOLOGY.]

ANIMAL STRENGTH. As early as the year 1680 Borelli published a treatise, entitled 'De Motu Animalium;' and since that time the determination of numerical expressions for the amount of human and animal labour has occupied the attention of many distinguished mathematicians and experimenters; but to none is this branch of mechanical philosophy so much indebted as to Coulomb. The subject will be of much importance as long as it shall be found necessary to employ men or animals, either in conveying burdens or in giving motion to machinery, since by it the employer is enabled to ascertain what is the greatest quantity of useful work which may be obtained from such agents without subjecting them to a degree of fatigue which might in time prove injurious to their health or bodily powers.

The dynamical unit employed by Coulomb is one kilogramme (=2.2055 pounds avoirdupois), which is supposed to be transported to a distance equal to one kilometre (=0.6214 mile), and his expression for strength is the product of the number of kilogrammes in a burden by the number of kilometres in the distance in which the burden is conveyed during one working day of eight hours: for convenience, however, in this article the unit of weight is one pound avoirdupois, and the unit of distance is one mile; so that the expression for strength is the product of the number of pounds by the number of miles to which they may be conveyed in one such day.

With respect to men, Coulomb found that when a man travels unloaded on level ground he can walk 31 miles daily. Now, assuming the weight of a man to be 160 lbs., we have 160×31 or 4960 for the measure of his strength or the quantity of action, which is, consequently, equivalent to that of a machine capable of carrying 4960 lbs. to a distance of 1 mile, or one pound to a distance of 4960 miles in one day.

He found also, from a mean of the work done by the porters of Paris, that with a burden equal to 128 lbs. a man can walk 9·72 miles in a day, from which it follows (the weight of a man being 160 lbs.) that the quantity of action is $(160+128) \times 9{\cdot}72$, or 2799. If the weight of the man be not included, the quantity of action is $128 \times 9{\cdot}72$, or 1244; and this is to be considered as the useful effect. Subtracting 2799 from 4960, we have 2161 for the measure of the action, lost in consequence of the burden; but the useful effect, which in the first case was nothing, is in the second expressed by 1244.

By means of a formula, which was given by Euler, with the data afforded by these experiments, it is found that 272 lbs. constitute the greatest burden which a man of average strength can support, and under which he cannot move. It is found, moreover, that the useful effect is at a maximum when a man is loaded with 121 lbs.: under this burden he can walk $10\frac{1}{2}$ miles, nearly, in a day; and consequently the greatest useful effect is expressed by 1280.

Coulomb further determined, that when a man ascends a convenient flight of steps unloaded, the vertical heights of all the ascents during one day being added together, were equal to 1·82 miles; the quantity of action may therefore be expressed by $160 \times 1{\cdot}82$ or 291, as if the action were equivalent to that of a machine which could raise 291 lbs. to the height of 1 mile vertically, or one pound to the height of 291 miles during a day. When loaded with 150 lbs. the vertical height ascended was 0·494 miles: the whole quantity of action is, therefore, in this case $(160+150) \times 0{\cdot}494$, or 153, while the useful effect is $150 \times 0{\cdot}494$, or 74; that is, 74 lbs. raised 1 mile vertically.

It is remarkable that, from the result of Coulomb's experiments on the power of men ascending steps, both the greatest weight which a man can carry without moving, and the weight which he should bear to render his useful effect a maximum, are nearly the same in this case as they were found to be from experiments made with burdens carried on level ground.

Coulomb has also made experiments to determine the quantity of action in the case which most generally occurs when heavy goods are carried in towns, viz. that in which a porter, having delivered his burden, returns unloaded for another; and his conclusion is, that, in order to produce the most useful effect in this case, the greatest burden which a man should carry on level ground is 135 lbs., and with this he should walk 7 miles.

The quantity of useful action is therefore 135×7, or 945.

It is said that a London porter can carry 200 lbs. on his shoulders at the rate of 3 miles per hour; but this action can only be continued during a short time.

The following statements of the strength of men are taken from Hachette's 'Traité des Machines,' and from other sources; the numerical values being reduced so as to express the number of pounds carried by a man 1 mile per day of eight hours:—

Drawing a vessel on a canal	753459
Conveying a load (110 lbs.) in a wheel-barrow (1·018 miles per hour)	896
Drawing a small waggon on four wheels over rather unequal ground	857
Pulling horizontally, the weight being raised by a rope passing over a pulley	378
Rowing in a boat	374
Thrusting horizontally, as at a capstan	368
Turning a winch and axle	159
Digging with a spade	85·3
A soldier marching (12·43 miles) with his arms, &c. (60 lbs.) daily	745

With respect to the horse, the most useful way of employing his strength is to make him draw loads in a cart or waggon; but, even for such work, the estimates which have been made of the quantity of action performed daily are various.

According to Tredgold a horse can draw 125 lbs. at the rate of $2\frac{1}{2}$ miles per hour, which, for one day, would give $125 \times 2\frac{1}{2} \times 8$ or 2500. But Messrs. Boulton and Watt ascertained from trials, purposely made, that a strong horse can draw 125 lbs. at the rate of 3 miles per hour; and the measure of the power of such a horse is 3000, which expresses a number of pounds drawn 1 mile in a day. If this be multiplied by the number of feet in a mile, and the product be divided by the number of minutes in eight hours, the result (=33000) denotes a weight in pounds drawn 1 foot per minute during the eight hours; and that result is now universally adopted as a measure of the power of a horse.

The useful effect of a horse when walking in a circle, as in some mills, is considered as equivalent to	800
A horse carrying a soldier with arms, &c. (=200 lbs.), can go 25 miles in a day, which gives	5000
An African dromedary carrying only his rider (160 lbs.) can go between 7 and 8 miles per hour during nine or ten hours, which gives $160 \times 7\frac{1}{2} \times 9\frac{1}{2}$, or	11400
An Asiatic camel will carry burdens weighing from 500 to 800 lbs. (suppose 600) at the rate of $2\frac{1}{2}$ miles per hour. This, for a day of eight hours, gives $600 \times 2\frac{1}{2} \times 8$, or	12000

The velocity of a horse in walking is estimated at $5\frac{1}{2}$ feet per second, or $3\frac{3}{4}$ miles per hour; in trotting 12 feet per second, or $8\frac{1}{2}$ miles per hour; and in galloping 18 feet per second, or $12\frac{1}{4}$ miles per hour.

ANIMA'LCULES, in zoology, is the name given to minute animals of various classes, which require the aid of the microscope in order to be seen distinctly. [INFUSORIA.]

ANISE. [PIMPINELLA.]

ANJAR, the chief town of a district of the same name in the province of Cutch, in Hindostan. The town is built on the side of a hill, about 10 miles from the Gulf of Cutch, in 23° 4′ N. lat., 10° 16′ E. long. In 1819 Anjar experienced the shock of an earthquake, by which nearly one-half of the houses were thrown down, and about 200 persons were killed. The population in the following year was estimated at 10,000. (Hamilton's *East India Gazetteer*.)

ANJOU, one of the provinces or military governments into which France was divided before the revolution of 1789. It is nearly coincident with the department of MAINE-ET-LOIRE, and that part of INDRE-ET-LOIRE which is west of Tours.

ANJOU, COUNTS AND DUKES OF, were amongst the earliest noblesse of France. Some chronicler gives the title to the famous Roland. Charles the Bald, it is said, bestowed the province, in 870, upon one of his courtiers, from whom the first family of counts were descended. A count of Anjou, named Fulke, joined the early crusades, and became King of Jerusalem. His son Geoffrey married (in 1127) Matilda, or Maud, daughter and heiress of King Henry I. of England, to the crown of which kingdom he gave as heir Henry Plantagenet. Thus merged the first house of Anjou. Soon after the conquest of the province by the French, it was bequeathed by Louis VIII., in 1226, to his fourth son, Charles of Anjou, who commenced the second house of Anjou. He espoused the daughter of Raymond Berenger, last count of Provence, and through her inherited that extensive fief, including the greater part of the south of France. He accompanied his brother St. Louis in his crusade to Egypt, when he was taken prisoner with that monarch, but soon afterwards ransomed. His government of Provence was marked by rapacity, overbearing cruelty, and contempt for the privileges of his subjects. He was, however, selected by the pope for the throne of Naples, in opposition to Manfred and Conradin, the last of the Hohenstauffen. Charles of Anjou therefore made his preparations in men and money for the conquest of Naples, whilst his ally, the pope, opened to him his spiritual treasures, by preaching a crusade in favour of Charles against Manfred. The Angevin prince invaded Italy with an army of 30,000 men, in 1265, but that year, and almost another, passed away, before the French entered the kingdom of Naples, when, at Grandella, near Beneventum, a battle was fought in which Manfred lost his crown and his life, and the victor made a most cruel use of his victory. Not only was no mercy shown in the field, but the neighbouring town of

Beneventum was given up with its population to the brutal fury and avarice of the soldiers. After this consummation of his crusade, Charles of Anjou made his triumphant entry into Naples. His government bore the same stamp with his conquest; it was but a succession of oppression and rapine.

Charles of Anjou, as head of the Guelphic party in Italy, was more than sovereign of Naples. Ramifications of the two great parties disputed Tuscany also, and Charles marched to chase his enemies, the Ghibelins, from that country. In this enterprize also he succeeded, and the Guelphs of Florence procured his nomination as political chief of that city for a period of ten years.

The Ghibelin party, however, rallied. They summoned young Conradin, nephew of Manfred, from Germany to support their cause, and the young prince advanced with a small but valiant army of Germans into Italy. The armies met at Tagliacazzo, 5000 on the German, and 3000 on the Neapolitan side. Of these 3000 Charles placed 800 in ambush, and with them waited till the Germans, having routed the rest, were scattered in the pursuit. He then quitted his ambush, and gained an easy victory. Conradin was taken in flight. Charles did not blush to bring his young competitor to a mock trial, when he was of course condemned to death, which took place in one of the great squares of Naples. Charles of Anjou was present with all his court. When Conradin laid down his head for the executioner, he flung his glove amongst the crowd, thus challenging an avenger. The glove was picked up and carried to Don Peter of Aragon, who had married the daughter of Manfred, and who, under this claim, became the competitor of the House of Anjou.

For the time, however, Charles reigned without opposition, not only over Naples but over the whole of Italy. An interregnum of the pontificate left Rome at his disposal, whilst almost all the cities of Lombardy imitated Florence in acknowledging him as their protector, and in swearing allegiance to him. His superstition, however, seemed to lead him astray; he was guilty of great crimes, and he could not neglect an opportunity of washing them away. This induced him, when his brother St. Louis set out upon a new crusade, to assume the cross. Charles, however, arrived at Tunis only in time to take command of the army which the death of St. Louis had left without a leader, and having satisfied his vow, Charles hastened to make peace on condition that Tunis should be tributary to Sicily. Gain was ever his first object. In returning, he confiscated all the vessels of his allies, the Genoese, which had been wrecked in a storm, claiming them as waifs, although they had been damaged in the service of transporting his army.

But Charles's power, and his dream of founding an empire in Italy, were overthrown by the hands that had raised him. A pope was elected (Gregory X.), who had at heart the interest of Christianity more than those of a party. Instead of crushing the Ghibelins, he sought to reconcile them to the Guelphs, and in order to remove the

anarchy of Germany, he procured the nomination of an emperor in the person of Rodolph of Hapsburg, to whom Charles was forced to cede the hold which he had usurped over the north of Italy.

On a vacancy of the pontificate he succeeded, however, in procuring the nomination of a pope in his interests. From Martin IV. (so the pontiff was called), he obtained the preaching of a new crusade, directed, however, not against the north of Italy, but of Greece. It was by occupying the throne of Constantinople that Charles hoped to rise superior to Rodolph, and make good eventually his imperial claim on Italy itself. Whilst engaged in preparations for this great project, Peter of Aragon was making similar preparations for attacking Sicily and Naples. But Charles had raised an enemy amongst his own subjects more active and dendly than any kingly rival. This was John of Procida, a Sicilian noble, a partizan of the house of Hohenstauffen, and who had suffered confiscation and exile on that account. This man never rested, even during the years of Charles's greatest triumph and power, from exciting disaffection towards him; and an accident set fire to that train of disaffection and rebellion which John of Procida had prepared in Sicily.

It was on Easter Monday, in the year 1282, a day consecrated in Catholic countries to a mixture of gaiety and religion, that the citizens of Palermo set out according to custom to hear vespers at the church and village of Montereale, not far distant. The French soldiers and authorities joined the procession, and one of the soldiers grossly insulting a young girl, her betrothed lover instantly pierced the Frenchman with his own sword. This act was a signal; it corresponded so fully to the intentions and feelings of all present, that the cry of 'Death to the French' ran from mouth to mouth. The deed accompanied the word, and every Frenchman in the procession was assassinated whilst the vesper bell was still sounding. Excited by blood, the assassins rushed back to Palermo to complete their massacre. Not a Frenchman, save one, escaped: all, to the number of 4000, were butchered; and even Sicilian women, who had married Frenchmen, suffered the same fate, in order that the progeny of the hated strangers might be eradicated from the island.

This massacre, notorious under the name of the *Sicilian Vespers*, was of course the signal of revolt. John of Procida hastened to Peter of Aragon, who after some delay landed in Sicily, and assumed the title of its king. His admiral, Roger de Loria, sailed for Messina, to which place Charles had laid siege, and experienced no difficulty in capturing Charles's fleet, and defeating all his projects of vengeance. While struggling against repeated disasters he died at Foggia in the kingdom of Naples, at the age of seventy-five years, in the early part of 1285.

The posterity of Charles of Anjou continued to fill for a time the thrones of Naples and also that of Hungary. It is rather as kings of these countries than as counts of Anjou that their history is to be read or written, since of course they had become utter strangers to this province, and to France itself.

In consideration of this, King John of France reunited Anjou to the crown, giving it soon afterwards in appanage to his son, Louis, who thus commenced the third house of Anjou. The county was elevated into a duchy, by an ordinance of John, in 1360, and Louis is thus the first of the ducal house. He was born in 1339, was taken prisoner with his father at the battle of Poictiers, and remained long in England, but at length broke his parole and fled. On the death of his brother, Charles V., he became by his nomination regent of the kingdom; but, instead of consulting the prosperity of France, he sought to amass wealth for the purpose of afterwards conquering the kingdom of Naples, to which Jeanne, the heiress of the last house of Anjou, had given him a title by adoption. The pope, as usual, seconded the attempt of the French prince, and Louis was accordingly crowned King of Sicily and Jerusalem at Avignon in 1382. He then led his armies to the conquest of Naples, but they perished, as Louis did himself, by disease, in 1384.

His son, Louis II., duke of Anjou, was also crowned King of Sicily by the pope; but in spite of three successive efforts he failed in establishing himself, and died in 1417.

Louis III., son of the last duke, was equally unsuccessful in his attempts on Naples, but he persevered, till he died at Cosenza, in 1434.

He was succeeded, not so much in his kingdom as in his claim, by his brother René, surnamed the Good king René, who not only failed in recovering the Italian empire of his family, but was dispossessed of Anjou itself by Louis XI.

From the days of Louis XI. the title of Anjou lay dormant, whilst the kings of France themselves prosecuted their claims to Italian dominion, as heirs of the Angevin princes. With Francis I. these hopes expired. His successor, Henry II., bestowed the duchy of Anjou upon his third son, who bore this title when elevated to the throne of Poland. As this prince, however, succeeded to the throne of France, he is better known under the name of HENRY III. Henry's younger brother, at first Duke of Alençon, succeeding to the title of Anjou, is best known under this latter name.

This prince was born in 1554, and was first christened Hercules, a name that was afterwards changed for that of Francis at confirmation. He had the small-pox very young, and was so 'horribly spoiled' that his mother, Catharine of Medicis, took a dislike to the boy, and sent him to Amboise to be educated apart from his brothers and from the court. Having once visited this place, Catharine spoke of him as 'a little *moricaud* (black), who had nothing but war and tempest in his head.' The young prince naturally returned his mother's aversion; and this may have been the original cause of his liberality of opinion, since it threw him into the confidence and friendship of Catharine's enemies, the Huguenots. He was then proposed as a husband for Queen Elizabeth, but the massacre of St. Bartholomew, which occurred soon afterwards, created a distance and aversion between the two courts.

On that occasion the Duke of Alençon maintained an honourable part. He so openly expressed his abhorrence of the event, and his admiration for Coligny, that he became as much an object of suspicion as any of the Huguenots. He was sent against La Rochelle, as to a school of martial orthodoxy, where he was nearly killed by a shot from the ramparts, but he still remained attached to the Huguenot party, who now conceived other hopes for him. Charles IX. was lingering under a mortal malady; his brother, the next heir, was in Poland. The Protestants hoped to elevate the Duke of Alençon to the throne in his place; thus exchanging a monarch whom they detested for one who favoured their own opinions. A plot was accordingly formed, which utterly failed through the perfidy and weakness of him whom it was designed chiefly to benefit. The Duke of Alençon, instead of escaping at the appointed moment, hurried to his mother's feet, and confessed the whole affair. The consequence was the arrest of all who were implicated, and the failure of the enterprize. To render the act more base on the part of Alençon, the whole weight of vengeance fell upon his confidents and followers. He, however, reaped no advantage from the act. Catharine of Medicis took him and Henry of Navarre with her, when, after the death of Charles IX., she went to welcome Henry III. on his return from Poland, and presented them as prisoners to the new king, who at first seemed severe, but inflicted no punishment.

At length the Duke of Alençon, becoming reconciled to the Huguenots, who once more trusted him, entered into more manly schemes of vengeance. He escaped from court in the autumn of 1575, and placed himself at the head of the armies raised by the reformers. A truce first, and a peace afterwards, were the fruit of a year's show of hostility. The Duke of Alençon secretly proposed to desert his party once more; but the Huguenot chiefs insisted upon favourable terms, which they obtained, in name at least, in 1576. The duke, on his part, obtained advantages equally favourable; letters patent being soon after issued, which gave him the duchies of Anjou, Tourraine, and Berri.

In this arrangement, however, the negotiators on both sides may be said truly 'to have reckoned without their host.' The Catholics, disgusted with the weakness of the monarch, formed 'The League,' which soon rendered the articles of peace null. The Protestants on their side kept armed and in an hostile posture, and Henry of Navarre was now rising amongst them to fill the place of honour that the now Duke of Anjou had ceded. War, in consequence, recommenced, and, strange to say, the Duke of Anjou himself appeared in command of a Catholic army.

In perusing the history of these times, it is difficult to say where most fickleness is found, whether in princes, or in the people. After having turned against the Huguenots, and even sacked one of their towns, the Duke of Anjou was still trusted by them; and when overtures were made to him by the malcontents of the Low Countries, several of the leading Protestants forsook Henry of Navarre for the banner of the Duke of Anjou. Sully himself was of this number. Henry was

afflicted by this desertion, but remarked, that Anjou had 'so little courage, so little address, and so false a heart, that he would soon throw away all the advantages that fortune placed at his command.'

Catharine of Medicis and Henry III., reconciled to their son and brother, now laboured to procure for the Duke of Anjou those very prizes that Coligny had before sought to give him—the sovereignty of Flanders, and the hand of Queen Elizabeth. At the head of a French army the Duke of Anjou marched against Don John of Austria. He had at first some success, but not being so well received by the Flemings as he expected, his career of conquest was suspended. In pursuance of the other part of his scheme, he had deputed to Elizabeth his envoy, Simier. The French manners and gallantry of this personage quite won the English queen, who threw off much of her habitual prudery, and began to entertain serious thoughts of marrying Anjou. She made him a present of a considerable sum of money, and went so far that articles of marriage were drawn up. Fortune seemed on all sides to favour the duke.

He was elected sovereign of the Netherlands in 1581, and took possession of Cambray in spite of the Prince of Parma. Thus, crowned with honour, the duke hastened over to England to terminate in person his suit with the queen. Nothing could be more brilliant or warm than his reception, which, however, ended in nothing.

At length the Duke of Anjou took his departure from England to govern the Netherlands. Bred up at the French court, he had no idea of a sovereign whose authority was to be shackled in any way, either by the institutions of a country, or even by his own most solemn oaths. The son of Catharine of Medicis was not to be thus restrained. The Duke of Anjou appeared to assume the sovereignty of the Netherlands with the determination to usurp despotic authority, and trample on the citizens as well as the family of Orange.

The people were roused, and not only Anjou himself, but the French, were expelled by the united force and amidst the general execrations of the country.

From this hour the Duke of Anjou sunk into insignificance. He was too low in fortune and in character to mingle or to have influence in any party, or in any struggle. He expired soon after, in 1584, at Château Thierry.

ANJOUAN. [ANZUAN.]

ANKARSTROEM, JAMES JOHN, a Swede, born in 1759, of a family then recently ennobled. He was placed in the king's guards as ensign, but left the service when only twenty-four years of age, having obtained the honorary or brevet rank of captain in the army; he then retired to his patrimonial estate in the country. He seems to have been early dissatisfied with Gustavus III. on account of the change that king had effected in the constitution of the country. [GUSTAVUS III.] His dissatisfaction increased; and for some expressions before an assembly of peasants he was imprisoned for a time, and then released. In 1789, when the king, after suppressing the senate and arresting the most refractory members of the nobility, came in person to their Chamber, which he had previously surrounded with his soldiers in order to force them to assent to his innovations, Ankarstroem spoke with great vehemence, even in the king's presence, against the violation of the constitution, and his speech made a considerable impression on the assembly. It was soon after this that he first thought of murdering the king, without being connected with any other conspirators; but falling in afterwards with several disaffected nobles, among others counts Horn and Ribbing, he communicated to them his purpose, and they encouraged him in his determination. They first tried to seize the king at Gefla, where he had convoked the Diet in 1792, but being thwarted in their design, they at last determined to strike the blow at a masked-ball where the king was to be present, on the 16th March, 1792. Count Horn agreed that he should point out the king among the crowd to Ankarstroem. This was done, and Ankarstroem fired a pistol loaded with two balls, and dangerously wounded the king in the thigh. He was not then recognised, and went out of the hall unmolested, but was subsequently arrested, was condemned to be publicly whipped with rods for three successive days, and then to be beheaded after having his right hand cut off. The king had expired a few days after receiving the wound. Ankarstroem went to the scaffold with resignation; he was then only thirty-three years of age. Many other persons were arrested and tried; two of them destroyed themselves, but none were executed. Counts Horn and Ribbing, and Colonel Lilientholm, were banished for life. The report of Ankarstroem's trial was published at Stockholm.

ANKER, a liquid measure in use at Amsterdam and some other towns of northern Europe. It contains 8¾ imperial gallons, or 2310·62 cubic inches.

ANKERITE, a rhomboidal crystal, yellowish white, translucent, and vitreous in lustre. It consists of—Carbonate of lime, 51·1; carbonate of magnesia, 25·7; carbonate of iron, 20·0; carbonate of manganese, 3·0 = 99·8.

ANKLAM, a strong town of Hither Pomerania, in Prussia, lying on the river Peene, 26 miles S.E. of Greifswald. Its port enables it to carry on a brisk intercourse with other countries, and it possesses considerable manufactures of woollens, linens, leather, and tobacco. The population is about 7000.

Anklam is the capital also of a circle of the same name in the government of Stettin, which circle contains 23,593 inhabitants.

ANKO'BAR. [ABYSSINIA.]

ANNA BOLEYN. [BOLEYN.]

ANNA COMNE'NA, the daughter of Alexius Comnenus I., emperor of Constantinople, born December 1, 1083. She was the favourite child of Alexius, and her talents were sedulously cultivated by an education comprehending the study of eloquence, poetry, mathematics, natural science, and the philosophy of Plato and Aristotle (see her preface to the 'Alexiad'). She married Nicéphorus Bryennius, a man of high birth and of high literary attainments. Presuming on

parental partiality, she solicited Alexius to name her husband for his successor, to the exclusion of her brothers, John and Isaac; and failing in this, on the death of Alexius and the accession of John, she conspired against John's life, in which she also failed. On the discovery of the meditated treason, the life and fortune of Anna became justly forfeited. Her life was spared by the clemency of John, her brother, the best and greatest of the Comnenian princes; and the guilty princess escaped with no further punishment than a forced retirement from the world, and exclusion from the splendour and intrigues of a court. Thus thrown on herself, she relieved the heaviness of her solitary hours by composing in Greek the 'Alexiad,' a history of her father's life and reign, in fifteen books, from 1069, twelve years before he ascended the throne, to his death in 1118. She completed it in 1148, and died in the same year. The 'Alexiad' is distinguished by an air of filial piety, both as regards the person and the fame of Alexius, but is overloaded by rhetorical display, and by the affectation and misplaced obtrusion of science. Individuality of character is lost in indiscriminate panegyric, and the likeness is rendered suspicious by the barefaced flattery of the portrait. The most curious and important part of Anna's history, as of her father's reign, is that which relates to the first crusade.

The 'Alexiad' forms a part of the collection of Byzantine historians. The first complete edition of it was published at Paris, 1651, by the Jesuit, Poussines, with a Latin translation and glossary. It has been translated into French by Cousin, and into German by F. Schiller.

ANNA IWANOWNA, empress of Russia, was the second daughter of the Czar Iwan or John I., the elder brother of Peter the Great, and for some time his associate on the throne. She was born on the 8th of February (O. S.), 1694. In 1710 she was married to Frederic William, duke of Courland, who died in 1711. On the death, without issue, of the Emperor Peter II., on the 29th of January, 1730, after an attempt by the family of the Dolgorouckis to elevate the Princess Catherine of that house, who had been betrothed by the late king, to the throne, and a second attempt by a party of the nobles to limit her authority, the conditions of which she had signed, but declared to be null as fraudulently obtained, and the authors of which were dismissed from her councils, she began to reign with all the privileges and authority of her ancestors.

One of the first acts of the new reign, after these domestic matters had been arranged, was to enter into a treaty with Denmark, with which power Russia had been in a state of hostility since the time of Peter the Great. Another treaty was also soon after made with Persia, by which several of the conquests of Peter the Great, which had been found only sources of expense to Russia, were restored to that power. About the same time an embassy arrived at Petersburg from China, being the first which had ever been sent from that country to any European court.

This peaceful policy however was soon interrupted. On the 11th of February, 1733, Augustus II., king of Poland, died suddenly at Warsaw, and the three powers of France, Austria, and Russia, were immediately embroiled in a contest respecting the succession to the vacant throne. France supported Stanislaus Lescinski, who had formerly been king, but had been deprived of his crown by the result of the great battle of Pultowa in 1709; and the two other powers joined to bring about the nomination of the Elector of Saxony, the son of the late sovereign, afterwards Augustus III. During this war the empress sent Count Lacy into Germany to assist the Emperor Charles VI. with a body of 10,000 men, who advanced as far as the Rhine, and were the first Russian troops which had ever been seen in the centre of Europe.

In the course of the same year an expedition was sent to the Crimea against the Tartars inhabiting the steppes between that peninsula and the Ukraine, who had long been in the habit of making incursions into the Russian territory. This led, in 1736, to hostilities with Turkey, in which the Russians took Perecop and Azof, but after a war of three years they were obliged to make peace, and to restore to the Turks Ockzakow and all the other conquests of Russia, except Azof, the fortifications of which however it was stipulated should be destroyed. The year before the question of the Polish succession had been settled in favour of Augustus by the treaty of Vienna, concluded on the 18th of September.

The peace with Turkey was proclaimed at Petersburg on the 26th of February, 1740. Towards the end of September the empress was taken ill, and although no apprehensions were entertained at first, the attack soon assumed a serious form. When she found herself in this state she proceeded to arrange the succession, and on the 18th of October the Prince Iwan, the son of Anthony Ulrick, duke of Brunswick, and the grandson by his mother of the empress's elder sister Catherine, being then a child only three months old, was publicly declared Grand Duke of Russia, and successor to the throne. This matter having been settled, the empress died on the 28th of the same month.

The Empress Anna had a considerable share of the ability which has long distinguished the imperial family of Russia, but she was not a very popular sovereign, owing principally to the many acts of oppression which were perpetrated in her name by her favourite Biron, as he called himself, his true name being Bieren, a minion whom she had raised from a low condition to be gentleman of the chamber in her court at Courland, and whom, having brought him with her to Russia, she eventually forced the nobility of Courland to elect as their duke. On her deathbed she also appointed this person regent of the empire, till her successor should attain his eighteenth year; but her signature to the paper, by which this disposition was made, is said to have been obtained partly by fraud and partly by force. Biron did not long enjoy his dignity, having before the end of the year been seized by a body of conspirators, and soon after banished to Si-

beria. In one important respect Anna did something to reform the gross habits of the Russian court, namely, by discountenancing and putting down as far as she could the drunkenness in which both men and women had been accustomed to indulge. Her favourite amusements were music and theatrical entertainments. It was in her reign, in 1736, that the first Italian opera was played at Petersburg.

ANNABERG, a town in the Erzgebirge (Ore-Mountain district) of the kingdom of Saxony, 2800 feet above the level of the sea, containing 5500 inhabitants. It has considerable manufactures of cotton-lace, bobbinet, and ribbons, and trades in silver, tin, cobalt, and marble. Annaberg has a handsome church, orphan asylum, high school, and savings' bank. It is about 36 miles S.W. of Dresden.

ANNAH, a town on the right bank of the Euphrates, about 34° 15′ N. lat., 41° 50′ E. long. Opposite the town is a line of cultivated islands. The town consists of a long narrow winding street, at the base of the hills which here line the Euphrates. The town contains several mills, some for irrigating the grounds and others for grinding wheat, and the remains of four ancient castles; there are also two mosques, and a beautiful minaret 80 feet high. There is a manufactory of coarse cloth for Arab cloaks; much wool is prepared, and some cotton. The number of houses is about 1800. Annah has always been a town of some importance from its position in the desert, and serves as a resting-place between Bagdad and Aleppo, and between Basra and Aleppo. The remains of old Annah, the A'natho of Isidore, cover one of the islands, and extend two miles along the west bank of the river.

ANNALS, in Latin *Annáles*, is derived from *annus*, a year. Cicero in his second book, 'On an Orator' ('De Oratore,' c. 12), informs us, that from the commencement of the Roman state down to the time of Publius Mucius, it was the custom for the Pontifex Maximus annually to commit to writing the transactions of the past year, and to exhibit the account publicly on a tablet (*in albo*), where it might be read by the people. Mucius was Pontifex Maximus in the beginning of the seventh century from the foundation of Rome. These are the registers, Cicero adds, which we now call the 'Annales Maximi,' the great annals. It is probable that these annals are the same which are frequently referred to by Livy under the title of the 'Commentarii Pontificum.'

The word annals, however, was also used by the Romans in a general sense. Cicero, in the passage in his work 'De Oratore,' says, that the first narrators of public events, both among the Greeks and Romans, followed the same mode of writing with that in the 'Annales Maximi;' which he further describes as consisting in a mere statement of facts briefly and without ornament. In his work 'De Legibus' he characterizes history as something distinct from this, and of which there was then no example in the Latin language. It belongs, he says, to the highest class of oratorical composition.

The distinction which the historian Sempronius Asellio made between Annals and History is this, as quoted by Gellius—'Between those who had intended to leave annals, and those who had attempted to narrate the acts of the Roman people, there was this difference: Annals only affected to show what events took place in each year, a labour like that of those who write diaries, which the Greeks call Ephemerides. To us it seemed appropriate not merely to state what had been done, but also with what design and on what principle it had been done.' Accordingly annals are materials for history.

An account of events digested into so many successive years is now usually entitled, not a history, but annals. The 'Ecclesiastical Annals' of Baronius, and the 'Annals of Scotland,' by Sir David Dalrymple (Lord Hailes), are well-known examples. In such works so completely is the succession of years considered to be the governing principle of the narrative, that this succession is sometimes preserved unbroken even when the events themselves would not have required that it should, the year being formally enumerated although there is nothing to be told under it. The year is at least always stated with equal formality, whether there be many events or hardly any to be related as having happened in it.

ANNAMABOE, or ANNAMABOO, a town with a fort belonging to the English, on the Gold Coast in West Africa. It is 10 miles E. from Cape Coast Castle, and 6 miles E. from the Dutch fort of Nassau, in 5° 5′ N. lat. and 5° 40′ W. long. The fort of Annamaboe is considered to be the strongest on the coast. It is of a quadrangular form, and is built on a low site close to the shore, the town surrounding it in the form of a crescent, and coming down to the sea on both sides of it. The inhabitants are chiefly employed in the trade in gold, of which this fort has long been the chief mart. A ledge of rocks extends in front of this town a few yards from the shore, and, it is said, makes a good breakwater.

ANNAMOOKA. [ROTTERDAM, NEW.]

ANNAN, River and Town. [DUMFRIESSHIRE.]

ANNANDALE. [DUMFRIESSHIRE.]

ANNA'POLIS, a city and port of entry, capital of Maryland, on the W. bank of the Severn, 2 miles from its mouth in the Chesapeake, stands in 39° N. lat., 76° 43′ W. long., 25 miles E.N.E. from Washington. Annapolis, though only an inconsiderable place, with a population of about 2792, in 1840, has been the seat of government for Maryland ever since 1699. A branch of the Baltimore and Washington railroad runs to Annapolis. The tonnage of the port, in 1840, was 4519.

ANNA'POLIS, a county of Nova Scotia, in the N.W. part of the province, bordering on the Bay of Fundy. The first European settlement in Nova Scotia was made by the French in this quarter, in the year 1604, at the place where the town of Annapolis now stands. The French settlement was called Port Royal, and was taken by the English in 1614, and again in 1710. On this last occasion, the name of the town was changed to Annapolis, in honour of Queen Anne; at the same time the province, which had been

called Acadia by the French, had its name changed to Nova Scotia. Under this name it was ceded to England by France in 1713.

The town of Annapolis, formerly the seat of government of the province, in 44° 40′ N. lat., 65° 37′ W. long., is built on a peninsula, formed where the two rivers, Annapolis and Allen, discharge themselves into Annapolis Bay. Since the building of Halifax it has lost much of its importance.

The river Annapolis rises in the township of Cornwallis, and falls into the Bay of Fundy, through Digby's Gut, having previously expanded into a wide æstuary, called Annapolis Bay. The river is navigable for boats and small vessels through the greater part of its course.

ANNA'TES, from *annus*, a year, a sum paid by the person presented to a church living, which sum is the estimated value of the living for a whole year. It is the same thing that is otherwise called primitiæ, or first-fruits. [FIRST-FRUITS.]

ANNE OF AUSTRIA, queen of Louis XIII. of France, and regent during the minority of Louis XIV., occupies a prominent place in French history. Daughter of Philip II. of Spain, she became the wife of the young Louis XIII. in the year 1615. The great Henry IV. of France had for his darling project the humbling of the House of Austria. His queen, Mary of Medicis, was averse to this policy, and no sooner was Henry in his grave than she took measures for a reconciliation with Spain, and sealed it by a double marriage, one of which was that of young Louis XIII. with Anne of Austria. The administration, however, fell in a few years into the hands of Cardinal Richelieu, who resumed Henry IV.'s views of humbling the pride and ambition of the House of Austria. In this he instantly found an opponent in Anne of Austria, and a struggle ensued betwixt them, in which Anne, though a queen, and a queen regnant, was compelled to yield, as long as he lived, to the great minister.

The cardinal by his intrigues contrived to render the king jealous and suspicious of her, to implicate her in the conspiracies of his brother Gaston and some of the nobility, and to avail himself of the folly of the Duke of Buckingham in avowing a passion for her. She thus remained without influence, alienated from the king's affections and council, till death took away monarch and minister, and left to Anne, as mother of the infant king, the undisputed reins of power.

There was then a change of policy similar to that which had taken place on the death of Henry IV. Anne chose for her minister the Cardinal de Mazarin. This choice, though perhaps the wisest, was still not the less fraught with danger. It alienated from her at once the party of the noblesse, which, crushed by Richelieu, had made common cause with Anne in her disgrace, and now raised its head to claim vengeance and spoil. Mazarin's advice compelled his mistress to resist the unreasonable demands of these, her former partizans; and the consequence was a general conspiracy against the queen and her minister. Mazarin, like his predecessor, might have triumphed over the noblesse alone; but this class now called to its aid a new and hitherto neglected body, that of the citizens, or burgess-class. These were easily inflamed against Mazarin, as a foreigner, and as a financier fertile in the invention of new taxes. An attempt on the part of the queen to treat the magistrates as she had treated the Duke of Beaufort, by imprisoning them, gave birth to a popular insurrection, which proved successful. The queen and court were for a time prisoners in the Palais Royal, and compelled to submit to the dictates of the mob. A civil war commenced between Anne, her minister, and their adherents on one side; and the noblesse, the citizens, and people of Paris on the other. It might have been easily supposed that the advantage in such a quarrel must necessarily remain to the latter. But Anne, with the aid of Mazarin's address, after many vicissitudes of fortune, came off triumphant. A suspension or rather a cessation of hostilities was produced by the retirement of Mazarin. He returned, however, for Anne was but a cypher without her minister, and the war again broke out. The court had secured a defender in Turenne, who triumphed over all the valour of the young noblesse, although headed by the great Condé. The result of the rebellion, and of Anne of Austria's administration was, that the nobles and middle classes, vanquished in the field, were never afterwards able to raise their heads, or to offer resistance to the royal power, up to the period of the great revolution. Louis XIV. is in general said to have founded absolute monarchy in France. But it was rather the blunders and the frivolity of those who idly espoused the cause of freedom during that monarch's minority which produced this effect. Anne of Austria's triumph was that of monarchy. She, or at least the events of her regency, contributed far more to it than all the subsequent imperiousness of Louis XIV.; and hence the epoch of Anne's administration is one of the most important in French history. Her influence over the fate and the court of France continued for a long time; her Spanish haughtiness, her love of ceremony, and of all the pride of power, were impressed by education upon the mind of her son, Louis XIV., who bears the blame and the credit of much that was hers. Anne of Austria died at the age of sixty-four, in the year 1666.

ANNE, Queen of England, the second daughter of James II. by his first wife Anne Hyde, was born at Twickenham on the 6th February, 1664. She was educated in the religion of the church of England; and in 1683 was married by the Bishop of London to Prince George, brother of Christian V., king of Denmark. At the revolution in 1688, Anne and her husband adhered to the dominant party of her brother-in-law William III.; and by the act of settlement, the English crown, in deafult of issue to William and Mary, was guaranteed to her and her children. During the reign of William she appears to have lived in much discomfort, neglected by her sister, and

treated with coldness by the king; and she sustained the heavier affliction of losing all her children in infancy, except one son, the Duke of Gloucester, who died at twelve years of age, in 1699. This event, as well as the previous death of Queen Mary, rendered an alteration in the act of settlement necessary; and the Princess Sophia, dowager electress of Hanover, and her descendants, being Protestants, were declared next heirs to the throne, in default of direct heirs to William and his sister-in-law Anne.

Anne ascended the throne, upon the death of William III., on the 8th March, 1702. On the 4th May, within two months after Anne had succeeded to the throne, war was declared by England, the Empire, and Holland, against France and Spain. The general progress of this memorable war is detailed under the head SUCCESSION, WAR OF. The extraordinary campaigns in the Low Countries and Bavaria, are described in the life of MARLBOROUGH, and the brilliant successes of the English arms in Spain under Lord PETERBOROUGH will be found in the notice of that singular commander.

The legislative union of Scotland and England, completed on the 6th March, 1707, was one of the most important events in the reign of Anne, of which the progress and consequences are detailed in their proper place. [SCOTLAND, UNION WITH.]

During the brilliant course of Marlborough's conquests, the spirit of political intrigue, which was perhaps never more fully developed than in the latter years of the reign of Anne, was stifled by the enthusiasm of the people. But ultimately the war became unpopular, and in the elections of 1710 the Tory supremacy was established. The Duchess of Marlborough, to whose talents and decision of character the queen had long submitted, was thrust out by the new favourite, Mrs. Masham. The ministry of Godolphin and Sunderland was displaced by that of Bolingbroke and Oxford. The command of the army was taken from Marlborough and bestowed upon the Duke of Ormond. During the progress of these convulsive changes, which must have been distracting enough to the quiet temper of Anne, she was deprived of the sympathy of her placable husband. Prince George of Denmark died on the 28th October, 1708.

The first act of the Tory ministry was to enter upon arrangements to bring the war to a conclusion. In 1711 negotiations were entered into with France, amidst the protestations of the allies of Great Britain, and these negotiations, after various difficulties, were terminated by the memorable treaty of Utrecht, April 11, 1713. The Tory ministry was, however, shattered by the quarrels of Oxford and Bolingbroke; the Whigs carried the nation along with them in their denunciation of the peace of Utrecht, which had left the country little besides a barren glory; and the dissatisfaction with the union of Scotland threatened to break out in open insurrection. The health of the queen gave way under these distractions. On the 20th July, 1714, she prorogued parliament for a month, and falling almost immediately after into a state of weakness and lethargy, died on the succeeding 12th of August. It is said that her last words were an expression of pity for her brother.

The reign of Anne has been called the Augustan age of English literature. It produced Addison, Arbuthnot, Congreve, Pope, Prior, Steele, and Swift, writers of a high degree of excellence in their particular walks, but scarcely to be compared with the great poets of the reign of Elizabeth, or with a few other illustrious names of a succeeding generation, such as Milton and Dryden.

ANNEALING is a process by which the extreme brittleness common to glass and some metals when cooled suddenly after melting, is avoided or removed. Such brittleness appears to be occasioned by some disturbance in the regular arrangement of the constituent particles in rapid cooling, and is remedied by cooling very slowly and regularly. Glass-houses are furnished with large *annealing-ovens*, in which this object may be attained by the gradual removal of the glass articles from a hotter to a cooler part, or by allowing the heat of the oven to subside slowly. Analogous operations are employed in the manufactures of cast-iron and other metals. Some malleable metals which crystallize on cooling are brittle in their crystalline state, but are rendered tough by heating and rolling. Zinc, for example, though incapable of more than very slight extension under the hammer, without cracking, becomes almost as flexible and tough as copper after being rolled at a moderate heat.

ANNECY, an episcopal city of Savoy, on the north bank of the Lake of Annecy, is situated at the extremity of a beautiful plain surrounded by mountains, 22 miles N.N.E. of Chambéry. It is the principal seat of manufacturing industry in Savoy, and has establishments for bleaching linen, cotton-spinning, calico-printing, and glass-making. Some coal and iron mines are worked in the neighbourhood. The population is 6400. The Lake of Annecy is about 9¼ miles long, and 3 wide: its greatest depth is 196 feet. By means of an hydraulic engine the water of the lake is discharged into canals which cross the streets of Annecy, and finally falls into the river Fier, which in its course turns the oil, fulling, corn and paper mills of the district.

ANNELIDA, red-blooded worms, as the common worm, the lugworm, the leech, &c., an extensive class of animals, having an elongated form, with soft semi-cartilaginous annulations at certain distances from each other, connected together by longitudinal and oblique muscles, enabling the animals to twist themselves in various directions; the whole is covered with a moist skin, indicating by segments, more or less apparent, the soft annuli: the first segment is furnished with a mouth, and, where they exist, with eyes, tentacles, &c.; the last segment is sometimes furnished with bristle-like appendages, and sometimes, as in the leech, is dilated into a sucker. Each segment, moreover, is usually beset with minute setæ or spines, of use in locomotion. In some species vascular tufts are present, constituting a respiratory apparatus. The blood is red, and

there is a system of veins and arteries. Each individual is bisexual. The nervous system consists of ganglia, united by means of a double nervous cord. Most of these creatures are defenceless, and seek safety by retiring into holes, which they bore in the soft earth, in the mud, or sand. Some, as the *Sabella* and *Terebella*, of the sea-shore, agglutinate around them particles of sand and of broken shells, which form a case in which they dwell. The *Serpula* exudes a calcareous secretion, which, hardening, forms a long twisted tube in which the animal resides, and from which it protrudes its head and beautiful respiratory tufts. Cuvier divides the *Annelida* into three orders; viz., 1st, *Abranchiata* (with no branchial tufts), as the earthworm, naïs, leech, hairworm, &c.; 2nd, *Dorsibranchiata* (with branchial appendages on the back), as the lugworm or *arenicola*, the sea-mouse or *aphrodita*, &c.; and 3rdly, the *Tubicolæ* or tube-makers, as *serpula, terebella*, which are stationary, inhabiting tubes of their own formation. Audouin and Milne Edwards make four sections or orders.

ANNIUS of Viterbo, a Dominican monk, who lived in the fifteenth century. His real name was Giovanni Nanni, but in conformity with the custom of the age he Latinized it, and dropped the first letter. He was born at Viterbo, in 1432, and died in 1502. He entered early into the Dominican order, and became famous for his acquaintance with the eastern as well as the Greek and Latin languages. His chief work, 'Antiquitatum Rariorum Volumina XVII.,' &c., professes to contain many historians of high antiquity, as Berosus, Manetho, and others; but these pretended histories are forgeries.

ANNIVE'RSARY is a term used to express the yearly return of any remarkable day—as the anniversary of the Gunpowder Plot on the 5th of November, the anniversary of the Restoration of the Stuarts on the 29th of May, &c.

Literary and scientific associations generally celebrate the anniversary of their original institution, and social parties are held in domestic life on the birthdays of heads of families.

ANNO BOM, the most southern of the four islands in the bight of Biafra, 1° 24′ S. lat., and about 5° 44′ E. long., is 4 miles long and 2 broad. It is mountainous, and rises abruptly from an unfathomable depth to the elevation of nearly 3000 feet. The regular winds are from the S.W. This island is chiefly visited for supplies. There is plenty of water on the island, but the heavy surf on the shore makes it difficult to procure. The population is about 3000, who live chiefly in a large village near the north-east point of the island, off which there is a tolerably safe roadstead.

ANNONAY. [ARDECHE.]

ANNOTTO. [ARNOTTO.]

ANNUAL REGISTER. The first Annual Register, properly so called, which appeared in this country, was the well-known and valuable work which still continues to be published under that title. There had been previous works approaching this character, of which the most important was 'The Historical Register,' which was published from 1716 to 1738, in annual volumes. It also appeared in quarterly, and, latterly, in monthly parts. The 'Annual Register' was projected by Robert Dodsley, the bookseller, in conjunction with Edmund Burke. The first volume appeared in June, 1759. This and several of the succeeding volumes were so popular that they quickly ran through five or six editions. There is no doubt that, for some years, the historical narrative was written by Burke, who also probably edited the publication, and selected the rest of its contents; and he continued to take a great interest in the conduct of the 'Annual Register' almost as long as he lived. The difficulty of bringing out the work within six months of the close of the year appears to have been very early felt. The work gradually fell into arrear; but, since 1801, the publication has proceeded regularly at the rate of a volume each year.

The 'New Annual Register,' a rival of the original work, was continued from 1781 to 1825.

The 'Edinburgh Annual Register' was commenced in 1808, and continued for nearly twenty years.

A French work, in imitation of the English Annual Registers, was commenced at Paris, in 1818, under the title of 'Annuaire Historique Annuel;' and there is also the 'American Annual Register,' published at New York.

ANNUALS. By this name gardeners designate all plants which, if sown in the spring, will flower, perfect their seed, and perish in the course of the same season. If two seasons are generally requisite for this purpose, they then call plants biennials; but, in fact, they are both of the same nature. Annuals, if sown in the autumn, become biennials; and biennials, if sown early in the spring, will go through every stage of life in the same year. The only difference between them is, that biennials are rather longer in completing the term of their existence than annuals are.

Two things only are to be observed in the management of tender annuals beyond the ordinary practice of every gardener. Firstly, they should not be raised in a very high temperature, if they are afterwards to be planted in the open air; and secondly, the seedlings should never be transferred from the seed-pan at once to the open ground, but should always undergo the intermediate operation of being transferred into small pots.

ANNUITY. An Annuity consists in the payment of a certain sum of money yearly, which is charged upon the person or personal estate of the individual from whom it is due; if it is charged upon his real estate it is called a rent-charge. (Littl., s. 220.) A sum of money payable occasionally does not constitute an annuity; the time of payment must recur at certain stated periods, but it is not necessary that these periods should be at the interval of a year.

An annuity may be created either for a term of years, for the life or lives of any persons named, or in perpetuity; and in the last case, though, as in all others, the annuity as to its security is personal only, yet it may be so granted as to descend in the same manner as real property; and hence

such an annuity is reckoned among incorporeal hereditaments.

A perpetual annuity, granted in consideration of a sum of money advanced, differs from interest in this, that the grantee has no right to demand back his principal, but must be content to receive the annuity which he has purchased, as long as it shall please the other party to continue it:—but the annuity is in its nature redeemable at the option of the grantor, who is thus at liberty to discharge himself from any further payments by returning the money which he has borrowed. It may, however, be agreed between the parties (as it generally has been in the creation of our own national debt, which consists chiefly of annuities of this sort) that the redemption shall not take place for a certain number of years. The number of years within which, according to the present law of France, a perpetual annuity (rente constituée en perpétuel) may be made irredeemable, is limited to ten. ('Code Civil,' art. 1911.)

An annuity for life or years is not redeemable in the same manner; but it may be agreed by the parties to the contract that it shall be redeemable on certain terms; or it may afterwards be redeemed by consent of both parties; and where the justice of the case requires it (where there has been fraud, for instance, or the bargain is unreasonable), a court of equity will decree a redemption. When such an annuity is granted in consideration of money advanced, the annual payments may be considered as composed of two portions, one being in the nature of interest, the other a return of a portion of the principal, so calculated, that when the annuity shall have determined, the whole of the principal will be repaid. Annuities for life or years, being the only security that can be given by persons who have themselves a limited interest in their property, are frequently granted in consideration of a loan. Besides this advantage, annuities for life, inasmuch as they are attended with risk, are not within the reach of the usury laws, and are therefore often used in order to evade them; and the legislature has accordingly required that certain formalities should be observed in creating them. It is enacted (by stat. 53 Geo. III. c. 141), 'That every instrument by which an annuity for life is granted shall be null and void, unless within thirty days after the execution thereof there shall be enrolled in the High Court of Chancery a memorial containing the date, the names of the parties and witnesses, and the conditions of the contract; and if the lender does not really and truly advance the whole of the consideration money, that is, if part of it is returned, or is paid in notes which are afterwards fraudulently cancelled, or is retained on pretence of answering future payments; or if, being expressed to be paid in money, it is in fact paid in goods, the person charged with the annuity (that is, the borrower) may, if any action should be brought against him for the payment of it, by applying to the court, have the instrument cancelled.' The same statute also enacts that every contract for the purchase of an annuity, made with a minor, shall be void, and shall remain so, even though the minor, on coming of age, should attempt to confirm it. The provisions of this act are intended to be confined to cases where the annuity is granted in consideration of a loan.

Annuities may be, and very frequently are, created by will, and such a bequest is considered in law as a general legacy; and, in case of a deficiency in the estate of the testator, it will abate proportionably with the other legacies. The payment of an annuity may be charged either upon some particular fund (in which case if the fund fails the annuity ceases) or upon the whole personal estate of the grantor; which is usually effected by a deed of covenant, a bond, or a warrant of attorney. If the person charged with the payment of an annuity becomes bankrupt, the annuity may be proved as a debt before the commissioners, and its value ascertained, according to the provisions of the bankrupt act (6 Geo. IV. c. 16, s. 54). The value thus ascertained becomes a debt charged upon the estate of the bankrupt; and hereby both the bankrupt and his surety are discharged from all subsequent payments.

If the person on whose life an annuity is granted dies between two days of payment, the grantee has no claim whatever in respect of the time elapsed since the last day of payment: from this rule, however, are excepted such annuities as are granted for the maintenance of the grantee; and the parties may in all cases, if they choose it, by agreement, provide that the grantee shall have a rateable portion of the annuity for the time between the last payment and the death of the person on whose life it is granted. On government annuities a quarter's annuity is paid to the executors of an annuitant, if they prove the death.

(Comyns, *Digest*, tit. *Annuity;* Lumley, *On Annuities.*)

ANNUITY, SCOTCH. The 53 Geo. III. c. 131, does not extend to Scotland. In that part of the country a fixed sum per annum paid periodically, though secured on heritable property, is called an annuity. Such an annuity is generally secured for life, and it may either be created by reservation in a transfer of the absolute property of the lands, thus constituting a burden on the new proprietor's title, or it may be granted by the absolute proprietor, the annuitant making his title real, as in the case of an absolute estate in land, by an 'infeftment.' Provisions to widows and children may be thus secured. This species of security on land is to be distinguished from an annual rent right, which has a reference to a capital sum, and was generally the form in which the payment of the interest of money lent on heritable security was made a real burden on the lands before the more effective security was devised of making a redeemable disposition of the lands themselves to the creditor. The annual rent right had its origin in the laws against usury. The taking of interest on a sum borrowed was illegal, but an irredeemable annuity was not affected by the law; and thus the lender was invested with a perpetual estate in the land. The form used for this purpose was afterwards, as above stated, brought in to aid of the heritable bond, but it is now seldom employed. When the

obligor of an annuity became bankrupt, there was until lately no statutory provision in Scotland for ranking the annuity creditor, i. e. for enabling him to prove. The Court of Session was in use to interpose equitably to allow the annuitant to draw a dividend on the value of the annuity. By 2 & 3 Vict. c. 41, ss. 40 and 41, provisions similar to those of the 6 Geo. IV. c. 16, ss. 54 and 55, relative to the claims of annuitants against the bankrupt estate of the principal debtor, and against sureties, were applied to Scotland.

ANNUITY, a term derived from the Latin, *annus*, a year; signifying, in its most general sense, any fixed sum of money which is payable either yearly or in given portions at stated periods of the year. Thus, the lease of a house, which lets for 50*l.* a year, and which has 17 years to run, is to the owner an annuity of 50*l.* for 17 years. In an ordinary use of the term, it signifies a sum of money payable to an individual yearly during life. In the former case, it is called in technical language an *annuity certain*; and in the latter a *life annuity*.

If money could not be improved at interest, the value of an annuity certain would simply be the yearly sum multiplied by the number of years it is to continue to be paid. Thus a lease for three years of a house which is worth 100*l.* a year, might either be bought by paying the rent yearly, or by paying 300*l.* at once. A life annuity, in such a case, will be worth an annuity certain, continued for the average number of years lived by individuals of the same age as the one to whom the annuity is granted. But if compound interest be supposed, which is always the case in real transactions of this kind, the landlord, in the case of the annuity certain just alluded to, must only receive such a sum, as when put out to interest, with 100*l.* subtracted every year for rent, will just be exhausted at the end of three years.

TABLE I.—*Present Value of an Annuity of One Pound.*

Years.	3 p. c.	3½ p. c.	4 p. c.	5 p. c.
1	·971	·966	·962	·952
2	1·913	1·900	1·886	1·859
3	2·829	2·802	2·775	2·723
4	3·717	3·673	3·630	3·546
5	4·580	4·515	4·452	4·329
6	5·417	5·329	5·242	5·076
7	6·230	6·115	6·002	5·786
8	7·020	6·874	6·733	6·463
9	7·786	7·608	7·435	7·108
10	8·530	8·317	8·111	7·722
15	11·938	11·517	11·118	10·380
20	14·877	14·212	13·599	12·462
25	17·413	16·482	15·622	14·094
30	19·600	18·392	17·292	15·372
40	23·115	21·355	19·793	17·159
50	25·730	23·456	21·482	18·256
60	27·676	24·945	22·623	18·929
70	29·123	26·000	23·395	19·343
For ever	33·333	29·571	25·000	20·000

To find the present value of an annuity of 1*l.* per annum continued for 10 years, interest being at 5 per cent., look in the column headed 5 p. c., and there, opposite to 10 in the first column, will be found the value 7·722*l.*, or 7*l.* 14*s.* 6½*d.* This would be commonly said to be 7·722 *years' purchase* of the annuity. For a convenient rule for reducing decimals of a pound to shillings and pence, and the converse, see INTEREST.

The last line in Table I. gives the value of the annuity of 1*l.* continued for ever: for example, at 5 per cent., the value of 1*l.* for ever, or, as it is called, a *perpetuity* of 1*l.*, is 20*l.* This is the sum which at 5 per cent. yields 1*l.* a year in interest only, without diminution of the principal. We see that an annuity for a long term of years differs very little in present value from the same continued for ever: for example, 1*l.* continued for 70 years at 4 per cent. is worth 23·395*l.*, while the perpetuity at the same rate is worth only 25*l.* Hence the present value of an annuity of 1*l.* which is not to begin to be paid till 70 years have elapsed, but is afterwards to be continued for ever, is 1·605*l.* at 4 per cent.; which sum improved during the 70 years, would yield the 25*l.* necessary to pay the annuity for all years succeeding.

TABLE II.—*Amount of an Annuity of One Pound.*

Years.	3 p. c.	3½ p. c.	4 p. c.	5 p. c.
1	1·000	1·000	1·000	1·000
2	2·030	2·035	2·040	2·050
3	3·091	3·106	3·122	3·153
4	4·184	4·215	4·246	4·310
5	5·309	5·362	5·416	5·526
6	6·468	6·550	6·633	6·802
7	7·662	7·779	7·898	8·142
8	8·892	9·052	9·214	9·549
9	10·159	10·368	10·583	11·027
10	11·464	11·731	12·006	12·578
15	18·599	19·296	20·024	21·579
20	26·870	28·280	29·778	33·066
25	36·459	38·950	41·646	47·727
30	47·575	51·623	56·085	66·439
40	75·401	84·550	95·026	120·800
50	112·797	130·998	152·667	209·348
60	163·053	196·517	237·991	353·584
70	230·594	288·938	364·290	588·529

In this table we see what would be possessed by the receiver of an annuity at the end of his term, if he put each year's annuity out at interest so soon as he received it. For example, an annuity of 1*l.*, in 40 years, at 5 per cent., amounts to 120·8*l.*, which includes 40*l.* received altogether at the end of the different years, and 80·8*l.* the compound interest arising from the first year's annuity, which has been 39 years at interest, the second year's annuity, which has been 38 years at interest, and so on, down to the last year's annuity, which has only just been received. When the annuity is payable half-yearly, or quarterly, its present value is somewhat greater than that given in the preceding Table. For the annuitant, receiving certain portions of his annuity sooner than in the case of yearly payments, gains an additional portion of interest. Since 4 per cent. is 2 per cent. half-yearly and 1 per cent. quarterly, and since every term contains twice as many half-years as years, and four times as many quarters, it is evident that an annuity of 100*l.* a-year, payable half-yearly, at 4 per cent., for 10 years, is the same in present value as one of 50*l.* per annum, payable *yearly*, at 2 per cent., for 20 years. Again, 100*l.* a-year, payable quarterly for 10 years, money being at 4 per cent., is equivalent to an annuity of 25*l.*, payable yearly for 40 years, money being at 1 per cent.

The principles on which the calculation of life annuities depend are more fully explained in the articles PROBABILITY and MORTALITY. We must observe, that in the term *value of an annuity* it is always implied that the first annuity becomes payable at the expiration of a term after the payment of the purchase-money.

The value of a life annuity depends upon the manner in which it is presumed a large number of persons, similarly situated with the buyer, would die off successively. Various tables of these *decrements of life*, as they are called, have been constructed, from observations made among different classes of lives. Some make the mortality greater than others; and of course, tables which give a large mortality, give the value of the annuity smaller than those which suppose men to live longer. Those who buy annuities would, therefore, be glad to be rated according to tables of high mortality or low expectation of life; while those who sell them would prefer receiving the price indicated by tables which give a lower rate of mortality. In assurances the reverse is the case: the shorter the time which a man is supposed to live, the more must he pay the office, that the latter may at his death have accumulated wherewithal to pay his executors. We now give in Table III. the values of annuities according to three of the most celebrated tables.

TABLE III.—*Present Value, or Purchase-money, of a Life Annuity.*

	Northampton.			Carlisle.			Gov.M.	Gov.F.
Age.	3 p. c.	4 p. c.	5 p. c.	3 p. c.	4 p. c.	5 p. c.	4 p. c.	4 p. c.
0	12·3	10·3	8·9	17·3	14·3	12·1		
5	20·5	17·2	14·8	23·7	19·6	16·6	19·3	20·0
10	20·7	17·5	15·1	23·5	19·6	16·7	18·8	19·7
15	19·7	16·8	14·6	22·6	19·0	16·2	18·0	19·1
20	18·6	16·0	14·0	21·7	18·4	15·8	17·3	18·6
25	17·8	15·4	13·6	20·7	17·6	15·3	16·9	18·1
30	16·9	14·8	13·1	19·6	16·9	14·7	16·4	17·5
35	16·9	14·0	12·5	18·4	16·0	14·1	15·7	16·9
40	14·8	13·2	11·8	17·1	15·1	13·4	14·9	16·2
45	13·7	12·3	11·1	15·9	14·1	12·6	13·8	15·3
50	12·4	11·3	10·3	14·3	12·9	11·7	12·4	14·2
55	11·2	10·2	9·4	12·4	11·3	10·3	11·0	12·8
60	9·8	9·0	8·4	10·5	9·7	8·9	9·7	11·3
65	8·3	7·6	7·3	8·9	8·3	7·8	8·2	9·6
70	6·7	6·4	6·0	7·1	6·7	6·3	6·8	7·9
75	5·2	5·0	4·7	5·5	5·2	5·0	5·4	6·3
80	3·8	3·6	3.5	4.4	4·2	4·0	3·8	4·9
85	2·6	2·5	2·5	3·2	3·1	3·0	2·3	3·3
90	1·8	1·8	1·7	2·5	2·4	2·3	1·3	2·1
95	·2	·2	·2	2·8	2·7	2·6	·6	1·0

The first of these is calculated from the Northampton Table, formed by Dr. Price, from observations of burials, &c., at Northampton. As compared with all other tables of authority, it gives too high a mortality at all the younger and middle ages of life, and, consequently, too low a value of the annuity. The second is from the Carlisle Table, formed by Mr. Milne, from observations made at Carlisle. It gives much less mortality than most of the old tables, and therefore gives higher values of the annuities; but it has since been proved to represent the actual state of life among the middle classes, in the century now ending, with much greater accuracy than could have been supposed, considering the local character of the observations from which it was derived. The third table is that constructed by Mr. Finlaison, from the observation of the mortality in the government tontines and among the

holders of annuities granted by government in redemption of the national debt, and differs from the former two in distinguishing the lives of males from those of females. Most observations hitherto published unite in confirming the fact, that females, on the average, live longer than males; and in the annuities now granted by government, a distinction is made accordingly. The mean between the values of annuities on male and female lives, according to the Government Tables, agrees pretty nearly with the Carlisle Tables, the rate of interest being the same. But it has been recently noticed that in the assurance offices female life turns out rather worse than male life.

To use the Table III., suppose the value of an annuity of 100*l.* a year, on a life aged 35, is required, interest being at 4 per cent.. We find in the column marked 4 per cent., opposite to 35, under the Northampton Tables 14·0, under the Carlisle 16·0, and under the Government Tables 15·7 or 16·9, according as the life is male or female. These are the number of pounds which ought to buy an annuity of 1*l.*, according to these several authorities; and taking each of them 100 times, we have:—

Northampton Table ..... 1400*l.*
Carlisle Table ..... 1600*l.*
Government Table (males) ..... 1570*l.*
Government Table (females) ..... 1690*l.*

An annuity on two joint lives is one which is payable only so long as both the persons on whose lives it is bought are alive to receive it.

TABLE IV.—*Present Value, or Purchase-money, of an Annuity of One Pound on two Joint Lives.*

Carlisle.—4 per cent.

Age.	0.	10.	20.	30.	40.	50.	60.	70.
0	8·9	12·3	11·7	10·9	9·9	8·6	6·6	4·7
5	16·8	16·5	15·6	14·4	12·9	10·5	7·8	5·0
10	17·0	16·3	15·2	13·8	12·0	9·2	6·5	4·1
15	16·3	15·5	14·3	12·9	10·5	7·9	5·1	3·0
20	15·6	14·7	13·6	11·8	9·0	6·4	4·1	2·4
25	14·8	13·8	12·5	10·3	7·8	5·0	3·0	2·6
30	13·9	12·9	11·4	8·8	6·3	4·0	2·3	1·6
40	12·1	10·9	8·6	6·2	3·9	2·3	1·6	
50	10·1	8·1	6·0	3·9	2·3	1·6		
60	6·9	5·3	3·6	2·1	1·5			
70	4·4	3·1	1·9	1·5				
80	2·4	1.6	1.3					

Northampton.—4 per cent.

Age.	0.	10.	20.	30.	40.	50.	60.	70.
1	8·3	10·8	10·1	9·4	8·6	7·5	6·1	4·4
5	13·6	13·5	12·6	11·7	10·5	8·9	7·0	4·6
10	14·3	13·4	12·6	11·5	10·1	8·3	6·0	3·5
15	13·4	12·6	11·8	10·6	9·1	7·1	4·7	2·5
20	12·5	11·9	10·9	9·6	8·0	5·8	3·4	1·7
25	11·9	11·2	10·2	8·8	6·9	4·6	2·4	0·2
30	11·3	10·5	9·3	7·8	5·7	3·4	1·7	
40	9·8	8·8	7·5	5·6	3·3	1·7		
50	8·1	7·0	5·3	3·2	1·7			
60	6·2	4·9	3·1	1·6				
70	4·1	2·8	1·5					
80	2·1	1·3						

The preceding table gives the results of the Carlisle and Northampton Tables on the value of this species of annuity, interest being at 4 per cent. The first column shows the age of the *younger* life, and the horizontal headings are *not* the age of the elder life, but the excess of the age of the elder life above that of the younger. For example, to know the value of an annuity in

two joint lives, aged 25 and 55, in which the difference of age is 30 years. In the Carlisle Table *opposite* to 25, the *younger*, and under 30, the *difference*, we find 10.3; and 8.8 in the Northampton. For the value of an annuity of 100*l.*, the first tables give, therefore, 1030*l.*, and the second 880*l.*

The value of an annuity on the longest of two lives, that is, which is to be payable as long as either of the two shall be alive to receive it, is found by adding together the values of the annuity on the two lives separately considered, and subtracting the value of the annuity on the joint lives. For the above species of annuity puts the office and the parties in precisely the same situation as if an annuity were granted to each party separately, but on condition that one of the annuities should be returned to the office so long as both were alive, that is, during their joint lives. For example, let the ages be 25 and 55 as before, and let the Carlisle Table be chosen, interest being at 4 per cent., we have then :—

TABLE III.—Annuity at age 55	11·3
Ditto 25.....	17·6
Sum	28·9
TABLE IV.—Joint Annuity, 55 and 25.....	10·3
Difference	18·6

The value, therefore, of an annuity of 1*l.* per annum on the survivor is 18.6*l.*

The value of an annuity which is not to be payable till either one or other of two persons is dead, and which is to continue during the life of the survivor, is found as in the last case, only subtracting *twice* the value of the joint annuity, instead of that value itself. In the preceding case it is 8.3*l.* For this case only differs from the preceding, in that the annuity is not payable while both are alive, that is, during the *joint* lives. Consequently the value in this case is less than that in the last, by the value of an annuity on the joint lives.

The value of an annuity to be paid to A from and after the death of B, if the latter should happen to die first, is the value of an annuity on the life of A, diminished by the value of an annuity on the joint lives of A and B. For the situation is exactly the same as if the office granted an annuity to A, to be returned as long as both should live. The ages and Table being as before, and the life on whose survivorship the annuity depends being that aged 25, we have :—

TABLE III.—Annuity at age 25	17·6
TABLE IV.—Joint annuity, 25 and 55	10·3
Difference	7·3

whence the value of the required annuity of 1*l.* is 7.3*l.*

We have seen that the security of the method for estimating the value of life annuities depends upon the presumption that the average mortality of the buyers is known. This average cannot be expected to hold good, unless a large number of lives be taken. Therefore, the granting of a single annuity, or of a few annuities, as a commercial speculation, would deserve no other name than gambling, even though the price demanded should be as high as that given in any tables whatsoever.

We should strongly recommend every one not to venture on important transactions without professional or other advice on which he can depend, unless he himself fully understands the principles on which tables are constructed. The liability to error, even in using the most simple table, is very great, without considerable knowledge of the subject; and most cases which arise in practice contain some circumstances peculiar to themselves, which have not and could not have been provided for in the general rules.

ANNUITIES AND REVERSIONS. [REVERSIONS.]

ANNULA'RIA (Sternberg), a genus of fossil plants with leaves in whorls, from the coal formations of Europe and America.

A'NNULUS, the geometrical name of a ring, or solid formed by the revolution of a circle about a straight line exterior to its circumference as an axis, and in the plane of the said circle.

ANNUS DELIBERANDI, in the law of Scotland, is the term of a year immediately following the time of the death of the proprietor of heritable property, allowed to the heir that he may make up his mind whether he will accept the succession with the burden of his predecessor's debts. Within that time he cannot be compelled to adopt an alternative, unless he has expressly or virtually resigned the privilege. The practice is adopted from the title of the Pandects ('De Jure Deliberandi,' xxviii. tit. 8). The term of a year was fixed by a constitution of Justinian ('Cod.' vi. tit. 30, s. 19).

ANO'A, a species of ruminating quadruped, apparently intermediate, as the horns would indicate, between the antelopes and the ox or bovine group. It is about the size of a sheep, and resides in large herds on the rocky mountains of the Island of Celebes. It is wild and fierce; the horns are erect, straight, sharp, depressed anteriorly, and irregularly ranged at the base, and for some distance. Hitherto only fragments of skulls of this species have been brought to Europe.

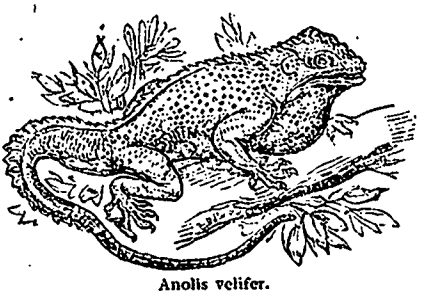
ANODY'NES, from the Greek word ἀνώδυνος (*anódunos*), which sometimes signifies, 'that which relieves from pain.'

Anodynes appear to be productive of benefit in two ways: first, by rendering the nerves of the part less sensible; and, secondly, by diminishing the violence with which the large vessels propel the blood, when the anodynes are given in sufficient quantity to influence the brain, and through it, by a process extremely complex, which we need not explain here, the contractile power of the heart and arteries. As most of the articles termed anodynes have a powerful influence over the brain, they generally produce sleep, if given

in a large dose: hence they are also denominated *hypnotics;* and from causing insensibility, they are also denominated *narcotics.* The knowledge of their possessing this power should lend us to observe great caution in their administration, lest by an over-dose we should produce a fatal coma, or very profound sleep, from which the patient might never be roused.

The substances which are used as anodynes are, with one exception, derived from the vegetable kingdom, and are further treated of under the names of the plants which produce them. They are Opium [PAPAVER]; Henbane [HYOSCYAMUS]; Woody Nightshade [SOLANUM DULCAMARA]; Deadly Nightshade [ATROPA BELLADONNA]; PRUSSIC ACID, and CARBONIC ACID GAS.

A'NOLIS, a genus of lizards, belonging to the Iguanian family. (See Dumeril and Bibron's work on Reptiles, vol. iv. p. 85.) In this genus the toes are dilated under the last joint but one, in the form of an oval disc, beset with imbricated scaly lamellæ: the skin under the throat is capable of being greatly dilated and puffed out, but when not so it hangs like a dewlap. There are two rows of teeth in the palate; *no* pores are placed on the thighs. The lizards of the genus anolis are peculiar to America and the adjacent islands; where they appear to take in some measure the place of the geckos, the structure of their toes enabling them, if not to traverse a smooth wall or ceiling, at all events to climb with great facility, as the pad beneath each toe is so constituted as to act like a sucker, and thus secure the animals more firmly as they make their way along branches of trees, or over stones; the toes, moreover, are long, and furnished with sharp hooked claws. In some species both the back and tail present a longitudinal ridge, or notched crest—in some the tail does not exhibit this character. These reptiles are slender, active, and for the most part of small size;—they frequent woods and rocky places, running, climbing, or leaping with singular address and celerity; so rapid indeed are their movements, that they have been compared to those of birds flitting from branch to branch. When tired by their exertions they stop, open their mouths, and pant like a dog. They are timid and harmless, and when under the influence of fear, or when otherwise excited, they dilate the dewlap to a vast extent, and at the same time assume a succession of ever-varying hues, the tints of the skin generally, but especially of the throat, changing with greater rapidity than in the chameleon. The dewlap of the *anolis bullaris* of the West India Islands is, when dilated, of a bright cherry red. Mr. Schomburgk says, relative to this species, 'they are often caught by boys, who take advantage of their fondness for musical sounds, arresting their attention, and then throwing a little noose over their head,' as they perch listening on the branches. ('Linn. Trans.,' vol. xvii. p. 560.) It has been remarked of the great crested anolis (*A. velifer*) of the same islands, that though timid and very restless, it is very curious, peeping from the boughs as if to watch what was going on; and so intent is it as to allow itself to be caught by means of a noose. It will also run into snares, which the children place near its haunt, alluring



Anolis velifer.

it from its concealment by imitating its low but shrill chirping. In this species, the body of which is a foot in length, a denticulated crest supported by bony processes runs down the centre of the back and the basal half of the tail.

Another species, the white scarfed anolis (*A. equestris*), inhabiting the Antilles, and equal in size to the great crested anolis, is remarkable for a white throat, and a white band passing over each shoulder and running halfway down each side.

Of the genus *Anolis* M. Bibron describes twenty-five distinct species. Their food consists of insects, which they pursue with great eagerness and rapidity. Cuvier, however, found berries in the stomach of the great crested anolis. They do not appear to be at all aquatic, like the Iguana, which often takes to the water, and swims well.

ANOMALI'NA (D'Orb.), one of the many genera of FORAMINIFERA (FOSSIL) which occur in tertiary strata.

ANOMALISTIC YEAR, the interval which elapses between two successive times when the earth is at the least distance from the sun. The anomalistic year is 25 minutes longer than the tropical year, being 365 days, 6 hours, 13 minutes, 45 seconds.

ANO'MALY (in Astronomy), a term derived from the Greek ἀνώμαλος (*anómalos*), unequal or irregular, and applied in astronomy to the angle through which the radius drawn from a planet to the sun, has moved with the planet from the time when the planet was at its least distance from the sun. The term was applied to this angle, as being the angle whose irregularities were first observed; though it must be confessed that this is not a happy specimen of mathematical nomenclature.

ANOMO'PTERIS (Brongniart), a fossil genus of Ferns, found in the bunter sandstein of Sulzbad.

ANONA'CEÆ, a natural order of plants consisting of tropical or subtropical trees and bushes, which usually abound in a powerful aromatic secretion, which renders the flowers of some highly fragrant, the leaves of others a grateful perfume, and the dried fruits of many so highly aromatic as to vie with the spices of commerce. Among these last is the Æthiopian pepper of the shops, which is yielded by the fruit of *Uvaria aromatica.* Of others of this order, the fruit is succulent and abounds in a delicate juice, which renders it a pleasant article of food: under the name of sour sop, sweet sop, and custard-apple, many kinds are cultivated in the West Indies and

South America. Finally, the bark of some separates readily into fibres which make excellent cordage.

Sour Sop Tree.

ANOPLOTHE'RIUM (from ἀν, privative, ὅπλον, a weapon, and θήρ, a wild beast; that is, a beast without tusks or offensive arms), an extinct genus of Pachydermatous Mammalia, described by Cuvier, and of which the fossil remains mixed with those of the *Palæotherium* occur in the gypsum quarries near Paris, and also, though more rarely, in the neighbourhood of Orleans and Genoa.

These anoplotheria differ from all known Pachydermata, whether living or extinct, in the characters of their dentition. The teeth consist of six incisors in each jaw, two canines and fourteen molars, reckoning both sides together; and these are arranged in a continuous and uninterrupted series, without any vacancy between the incisors and the canines, or between the latter and the molars. The canines resemble the incisors in form, and might be mistaken for them: the four posterior molars are like those of the rhinoceros. The feet are cloven, as in the deer or ox, and each toe was sheathed in a hoof. In Ruminants the metacarpal and metatarsal bones are blended into a single canon bone; but in the fossil remains in question, though the feet are cloven, these bones are separated into two, and therefore do not form canon bones. It would appear that the anoplotheria, though perhaps strictly within the pale of the Pachydermata, were in many points allied to the Ruminantia, and may be regarded as constituting a link between those orders. Their heads, judging from the skull, partook of the form of that of the horse and of the camel; the snout was not elongated, neither was there any proboscis. The anoplotheria are divided into three subgenera on various minor details of structure.

1. *Anoplotherium proper.*—Of this two species are described by Cuvier, one (*A. commune*) about the size of the ass; the other (*A. secundarium*) as large as a moderate-sized hog. These animals were low on the limbs, and were furnished with a long tail compressed horizontally at the base. It is surmised that they were, like the hippopotamus, aquatic in their habits, frequenting lakes and marshes, and feeding upon such vegetables as grow in humid localities. The flattened form of the tail indicates great powers of swimming and diving. There is a third or supernumerary hoof on the fore feet.

2. *Ziphodon.*—No additional false hoof. Inferior molars tuberculous. Cuvier describes a single species (*A. gracile*), of light and slender contour, like the gazelle; of small size, and furnished with a short tail. Its habits were probably analogous to those of some of the antelopes; it was fleet and active.

3. An additional false hoof both on the fore and hind feet. Cuvier describes three species—*A. leporinum*, about the size of a hare; and *A. murinum* and *A. obliquum*, not exceeding a guinea-pig. They have much of the form, and had probably much of the habits, of the little musk deer, or chevrotain, of Ceylon, Java, &c.

ANORTHITE, a doubly-oblique prismatic crystal, white, translucent, and of vitreous lustre. It consists of—Silica, 44·9; alumina, 34·46; lime, 15·68; magnesia, 5·25; oxide of iron, 0·74.

ANQUETIL DU PERRON, ABRAHAM HYACINTHE, was born at Paris, December 7, 1731. He dedicated himself to the study of the literature of the East, especially the Arabian and Persian; and he made use of the ample stores of oriental learning collected in the Bibliothèque du Roi in Paris. A French army being fitted out for India, Anquetil resolved to avail himself of this opportunity to visit India, and enrolled himself as a private soldier in 1754. It was only after his departure that his friends obtained for him a small pension (500 livres) from the French government, to assist him in the pursuit of his inquiries. He remained in India seven years, but the progress of the British power induced him to return to France in 1762. The Abbé Barthélémy procured him an appointment in the Bibliothèque du Roi, and in 1763 he was elected a member of the Académie des Belles-Lettres. From this time Anquetil devoted himself entirely to literary labours. In 1771 he published his principal work, a translation into French of the 'Zend Avesta,' or the sacred writings of the Guebres, attributed by them to Zoroaster. He died January 15, 1805.

ANQUETIL DU PERRON, LOUIS PIERRE, the elder brother of the oriental scholar, was born in 1723, and died in 1808. He is the author of a considerable number of historical works, of which, however, only one or two are now held in much esteem.

ANSBACH, ANSPACH, or ONOLZBACH, formed a portion of the old principality of Ansbach-Baireuth, in the southern part of Franconia, but it is at present merged in the circle of REZAT, in Bavaria.

ANSBACH, formerly ONOLZBACH, the capital of the extinct principality of that name, and now the capital of the circle of the Rezat, in Bavaria, lies in a fertile and richly-cultivated valley, traversed by the river Rezat, and is built round the confluence of that river with the Holzbach, 48° 12′ N. lat., 10° 33′ E. long., 30 miles S.W. of Nürnberg. The town is embellished with handsome squares, and is well and regularly built. The palace of the former Margraves of Ansbach is now a picture gallery and library, and its grounds are kept in repair for the recreation of the townsfolk. Ansbach is the seat of a court of justice and court of appeal, as well as of an evangelical consistory; it contains also one of the 18 royal gymnasia, or high schools, schools of design and music, and a society of arts and manufactures. The principal manufactures of the place are earthenware, tobacco, linens, cottons, woollens, and white-lead: the population is 11,420.

ANSELM, archbishop of Canterbury in the reigns of William Rufus and Henry I., commonly called St. Anselm, was by birth an Italian, and a native of Aosta, in Italy. He took the monastic habit in 1060, at the age of twenty-seven, at Bec in Normandy, where Lanfranc, afterwards Archbishop of Canterbury, was prior. Three years afterwards, when Lanfranc was promoted to the abbacy of Caen, Anselm succeeded him as prior of Bec, and when Herluin, the abbot of that monastery, died, Anselm became abbot of the house. Anselm came to England about A.D. 1092, by the invitation of Hugh Lupus, earl of Chester. Soon after his arrival, William Rufus nominated him (though with great difficulty of acceptance on Anselm's part) to the see of Canterbury, which had lain vacant from Lanfranc's death in 1089. Anselm, having first stipulated for the restitution of the possessions of the see as they had stood in his predecessor's time, was consecrated with great solemnity, December the 4th, 1093. In the following year a quarrel arose between Anselm and the king, in consequence of the determination of the archbishop to proceed to Rome to receive the pall investiture. The king refused to give him leave to go, but Anselm persisted, and as soon as the king had ascertained that Anselm had crossed the channel, he seized upon the archbishopric, and made every act of Anselm's administration void. The archbishop got safe to Rome, and was honourably received by the pope, whom he afterwards accompanied to Capua. Here he wrote a book upon our Saviour's incarnation; subsequent to which he assisted the pope at the synod or council of Bari, where he prevented Urban from excommunicating the King of England for his various and frequent outrages upon religion. The king, however, by presents and promises, finally bribed the court of Rome to desert Anselm, who retired to Lyon, where (with the interval of an attendance at a council at Rome in 1099) he continued to reside till he heard of William Rufus's death, with that of Pope Urban shortly afterwards. Henry I., immediately upon his accession, invited Anselm to return to England, but fearing his brother Robert's arrival as a competitor for the throne, he was crowned by another prelate. The archbishop was received in England with extraordinary respect both by the king and people, but refusing to be re-invested by the king, and to do the same homage as his predecessors, he again fell under the displeasure of the court; this continued for a long time, notwithstanding which he promoted the marriage of Henry with Matilda, eldest daughter of Malcolm, king of Scotland, though she was reported to be a nun, and afforded him assistance in other affairs. In 1102 another national synod was held under Anselm, at St. Peter's, Westminster, which was attended by the king and principal nobility. In the year following, at the request of the king and barons, Anselm himself took a voyage to Rome, to arrange, if possible, an accommodation, but the king, at the same time, from distrust, despatched an agent of his own to the papal court, who arrived before the archbishop. The pope still continued inexorable; but wrote a ceremonious letter to the king, promising compliance in other matters, if the king would but wave the matter of investiture. Anselm, in chagrin, again took up his residence at Lyon; while a fresh embassy to Rome from the king was still more unsuccessful than the former, the pope levelling the heaviest censures of the church against different persons of the English court who had dissuaded the king from parting with the investitures. Anselm now removed from Lyon to the court of Adela, countess of Blois, the king's sister, who, during a visit which Henry I. made to Normandy, contrived an interview between him and Anselm, July 22, 1105, at the Castle of l'Aigle, when the king restored to him the revenues of the archbishopric, but refused permission for Anselm to return to England unless he would admit the king's right of investiture. Anselm, still refusing, remained in France, and retired to the abbey of Bec; and though the English bishops, who till then had sided with the king, now changed their minds, and pressed Anselm to return, he refused. At length the pope adopted a middle course, refusing to give up the investitures, but agreeing to dispense with them so far as to give leave to bishops and abbots to do homage to the king for their temporalities. This was in 1106. The king now invited Anselm to England, but the messenger finding him sick, the king himself went over into Normandy, and paid him a visit at Bec, where all their differences were adjusted. Anselm, having recovered, embarked for England, and, landing at Dover, was received with extraordinary marks of welcome. From this time, little that is remarkable occurred in the life of Anselm, excepting a dispute with Thomas, elected Archbishop of York in 1108, who, wishing to disengage himself from dependency upon the see of Canterbury, refused to make the customary profession of canonical obedience. Before the termination of this dispute Anselm died at Canterbury, April 21, 1109, in the seventy-sixth year of his age.

The works of Archbishop Anselm were published first at Nürnberg, folio, 1491; at Cologne in 1573, and 1612; at Lyon in 1630; by Father Gerberon, at Paris, in 1675, reprinted in 1721;

and again at Venice, 1744, in two volumes folio. In the library of Lyon there is a beautiful manuscript of his meditations and prayers. Some of his pieces in the Cologne edition of 1612, and the Lyon edition of 1630, are thought to be suppositious.

Anselm was the first who restrained the marriage of the English clergy, by passing the ecclesiastical canons of the years 1102 and 1108. The canonization of Anselm took place in the reign of Henry VII. at the instance of Cardinal Morton, then Archbishop of Canterbury.

ANSER, a genus of aquatic birds, established by M. Brisson for the true geese, as separated from the swans and ducks. [GOOSE.]

ANSON, GEORGE, LORD, was the third son of William Anson, Esq., a gentleman of a good family, long established in Staffordshire. Anson's inclination to the seafaring life discovered itself early. In 1722 he was made master and commander of the Weazel sloop, and the year following was raised to the rank of post-captain, and to the command of the Scarborough man-of-war.

It was at the breaking out of the Spanish war that he first became an historical character. In 1740 he was appointed to the command of a small squadron, which was ordered to sail for the South Sea, a quarter where no attack was anticipated, to harass the coasts of Chili and Peru, and to co-operate occasionally with Admiral Vernon across the Isthmus of Darien. The scheme was well laid, but frustrated by unaccountable delays in the first instance, and afterwards by some unforeseen accidents. He doubled Cape Horn, in March 1741, after experiencing most tempestuous weather off that dangerous coast, in which his whole squadron was dispersed. He arrived, with only his own ship, the Centurion, at Juan Fernandez, 33° 40′ S. lat., 79° W. long., June 10, after suffering for nearly three months from a series of the most terrific storms, and from the ravages of the scurvy, which in that short time had carried off upwards of 200 from a crew of between 400 and 500 men, and left scarce enough of the remainder in health to work the ship. With the feeble remains of his squadron he left Juan Fernandez in September, kept the Spanish coast for eight months in continual alarm, made prize of several small vessels, and burned the town of Paita. The original design of the expedition being frustrated, he conceived the project of intercepting the Manilla or Acapulco galleon, a Spanish ship laden with bullion and other valuables to a vast amount, which sailed annually between Acapulco in Mexico, and Manilla, one of the Philippine islands. With this view he hovered on the west coast of America till May, 1742, when he set sail to cross the Pacific Ocean. In the course of this voyage the other vessels were destroyed for want of men to navigate them, and he proceeded with only the Centurion, and that but half manned, owing to the sickness and mortality which had thinned the crews. The hardship endured on this part of the voyage was extreme, from the shattered condition of the ship, as well as the prevalence of scorbutic disorders. The first land which the voyagers made was the uninhabited island of Tinian, one of the Ladrones, when, the health of the crew being in some degree recruited, Anson proceeded on his course to China; and arrived at Macao, an island and town in the Bay of Canton, November 12, 1742. He remained there till the beginning of 1743, during which interval the vessel was new-sheathed, and a reinforcement of sailors procured. He now resumed his design of intercepting the Spanish galleon, and he steered his course back to the Straits of Manilla. He met and took her after a short but sharp engagement, June 20, 1743. The prize was mounted with forty guns, manned by six hundred sailors, and laden with treasure and effects to the value of 313,000*l*. He returned to China for the purpose of selling her; and thence proceeded round the Cape of Good Hope to England, and arrived at Spithead in safety, June 15, 1744.

Soon after his return, Anson was appointed Rear Admiral of the Blue, and one of the Lords of the Admiralty. In April, 1745, he was made Rear Admiral of the White, and in July, 1746, Vice Admiral of the Blue. He was also elected parliamentary representative of the borough of Hedon, in Yorkshire. During the winter of that year, he commanded the Channel squadron in a long and tempestuous cruize. In the following spring, May 3, being in command of a powerful fleet of fourteen ships, besides a sloop, and fireship, he fell in with two combined French fleets, bound to the East and West Indies, laden with merchandise, treasures, and warlike stores, protected by a strong convoy. On this occasion he captured six ships of war, not one escaping, together with four armed East Indiamen. For his signal services, King George II. rewarded Admiral Anson with a peerage, by the title of Lord Anson, Baron of Soberton, in Hants. In the same year he was appointed Vice Admiral of the Red; and, on the death of Sir John Norris, Vice Admiral of England, an appointment rather of a civil than a naval character, but always given to a naval man. In 1748 he was appointed Admiral of the Blue, and commanded the squadron which conveyed George II. to and from Holland. In 1751 he was appointed First Lord of the Admiralty, in which station he continued, with a very short interval, till his death. The occasion of his temporary retirement was the unpopularity incurred by the government in consequence of the untoward events of which Admiral Byng was the victim; but those events belong more properly to the political history of the period than to the personal transactions of Lord Anson's life.

In 1758, being then Admiral of the White, he hoisted his flag on board the Royal George, 100 guns, and sailed from Spithead on the 1st of June. Sir Edward Hawke commanded under him. By cruizing continually before Brest, he covered the descent which was made that summer at St. Maloes and Cherbourg. On the accession of George III. he was appointed Admiral and Commander-in-Chief of his Majesty's fleets. He died suddenly, June 6, 1762, aged 65, at his seat at Moor Park, in Hertfordshire, having for some time been in a shattered state of health. His wife was the eldest daughter of Lord Chancellor

Hardwicke, and she died before him without issue.

His professional characteristics were those of discretion, coolness, and steadiness. His humanity was eminently displayed in his kind treatment of his prisoners; by which he won the admiration and respect of the American Spaniards, and did much to remove the opinion of the excessive cruelty of the English, arising out of the atrocities committed in past times by the buccaneers. He directed his attention to the improvements of geography and navigation, by making careful surveys of the coasts which he visited. 'Lord Anson's Voyage round the World' went through four large impressions the first year, and has been translated into most European languages.

ANSTEY, CHRISTOPHER, the author of the 'New Bath Guide,' was born in 1724. He was educated on the foundation at Eton, and succeeded to a fellowship at King's College, Cambridge. On his mother's death, in 1754, he succeeded to the estates of his maternal grandfather at Trumpington, and resigned his fellowship. In the year 1766 he published his 'New Bath Guide,' a satire on the follies of fashionable life, especially as developed at that watering-place. This is one of the lightest, wittiest, and most amusing satires of the kind in the English language, although its merits are tarnished by a broadness of humour, and an occasional irreverence in speaking of things connected with religion, which, though aimed at hypocrisy, and not intended to bring true religion into contempt, would scarcely be tolerated in the present day. Mr. Anstey spent the latter years of his life at Bath, and died there in 1805.

ANSTRUTHER. [FIFESHIRE.]

ANSWER. [PLEADING.]

ANT (*Formica*). The ants are a well-known group of insects belonging to the order *Hymenóptera*. (Latreille, in Cuvier's 'Règne Animal,' vol. v. p. 307.) From the earliest ages the industry and economy of these insects have attracted attention; but our knowledge of their habits and manners is the result of the patient observations of modern naturalists, among whom Huber (the younger) holds a conspicuous rank.

In tracing the general history of these insects, we may commence by observing that they are gregarious, multitudes uniting in the construction of dwellings, and in various works for the common good.

The inhabitants of an ant's nest consists of males, females, and workers or neuters, besides eggs, larvæ, and pupæ. The workers never acquire wings, which the males and females possess during the pairing season. The females may be distinguished by their superior size.

The Pairing of Ants.—If in the month of August or September an ant's nest be watched on some hot day, thousands of winged ants will be seen issuing forth, rising in the air with a slow movement, and settling on gates, stones, and posts. These are the males and females which have recently emerged from the pupa state and attained their complete development. They often appear in astonishing clouds which resemble wreathing columns of vapour. It is now that the males and females pair, and were it not for the destruction that takes place among the females, ants would perhaps become the pests of the land. In some of the tropical countries their ravages are notorious. With respect to the males, after pairing they perish; they have neither sting for defence, nor strong jaws for needful labour and the acquisition of food. The females are destined to found fresh colonies, and to replenish that from which they issued; but they do not appear to be voluntary agents; numbers are captured by the working ants, which during the pairing time have scattered themselves abroad, and they are reconducted to the nest, even by force, and vigilantly guarded; others are laid hold of by straggling parties of workers, who commence small colonies on their own account; but others escape, form a cell for the reception of their eggs, and thus found colonies without assistance. Multitudes are the prey of birds, or are driven into lakes or rivers. The females now lose their wings, and become contented with their imprisonment. There are generally several in a single nest, each attended by workers, who supply their wants; they exhibit no rivalry, but crowds follow in their respective trains, or surround them as they move along, rendering them every assistance, and paying every respect.

The Laying and Hatching of the Eggs.—The minute eggs laid from time to time by the females are, according to Huber, of different sizes, shades, and forms; they are not, when laid, glued to any fixed place, but are carefully collected and moistened by the workers (a plan which seems essential to their development), and laid in heaps in separate apartments, or carried from one to another as they may require a warmer or moister situation, or as the weather may render needful. In a few days the young grubs are disclosed, and require the most unremitting care. 'Not only have they to be fed, but to be removed to different ranges of cells, deeper or more superficial, according to the state of the weather, the temperature of the atmosphere, or the time of day. The devotion of the workers to the helpless larvæ is indeed extreme, and they spare neither labour nor their own lives in the protection of their charge. The larvæ of most species when fully grown envelop themselves in a cocoon of silk, and so assume the pupa state; still they require the same attention as previously, while other eggs and larvæ at the same time demand the services of their attendants. During all this time the settlement has to be kept clean, and to be repaired; fresh additions have to be made, and food has to be brought in. When the perfect insect is about to be developed, the aid of the workers is again in requisition. Instinct teaches them the precise moment when the young ant, enclosed in its shroud requires their aid in effecting its liberation. Three or four mount the cocoon and carefully open the silken envelope where the head lies, and gradually extract the prisoner. It is still enclosed in a thin pupa *case*, and from this they next cautiously liberate it, clearing the wings of the males and females, and the limbs both of these and the workers. The new-

born brood is still watched and fed, till the workers acquire strength and intelligence, and the males and females are quite ready to take wing. In the case of a single female founding a colony, all the duties of attending to the larvæ devolve upon herself, unless she can attract a few stray workers to assist her. Her first brood consists, however, mostly, if not exclusively, of workers, which are soon able to relieve her of all toil for the future. The young are fed by means of a fluid disgorged from the stomach of their nurses, as in the case of wasps and humble bees.

Food of Ants.—The food of ants is various, and consists alike of animal and vegetable substances. They are extremely partial to saccharine matters and to ripe fruit; but they do not hoard up provisions for winter, at least in our country, or the adjacent parts of the continent, as they pass the winter in a state of torpidity. They are very fond of the saccharine excretion of various species of *aphis*, called honey-dew; in fact Kirby and Spence term these *aphides* their milch cattle, which willingly render to them their liquid honey. Not only do ants dispute with one another respecting the possession of aphides, but a colony sometimes claims the sole right to the aphides of a neighbouring plant or tree, and resists the attempt of any other colony to poach on their manor. Huber and others assert that some ants (and especially the yellow ant), enclose a group of aphides on a branch within a cell of earth, and thus keep them in a sort of stable; or collect these insects and their eggs and young in their underground galleries in great numbers, in order to have them conveniently at hand.

Senses of Ants.—It cannot be doubted that ants are capable of communicating their wants and desires to each other: were this not the case there could be no order in the community. They are ever using their antennæ, touching each other in various ways, and appear, in short, to have a certain set of signals universally understood by the species. They exhibit great attention and sympathy towards the wounded of their own colony, assist each other in difficulties, or in carrying or dragging heavy burdens, and evidently experience pleasure on meeting their companions after absence. They are extremely sensitive, and appreciate the slightest alterations of temperature, or of the condition of the atmosphere. Sight, smell, taste, touch, and probably hearing, are all possessed by them.

Migration.—From some cause or other migrations of ants occasionally take place. In our country the fallow ant (*F. rufa*) is the most noted for this proceedure. In hotter countries vast armies of ants traverse whole districts, and ravage the land as they proceed; they march in dense columns and nothing stops their course; they carry buildings by storm; they climb over walls or undermine them, and should a river oppose their progress, they perseveringly endeavour to cross, though millions perish in the attempt.

The Mining, Masonry, and Carpentry of Ants.—The modes in which ants construct their cities differ considerably. The red ant, for example (*Myrmica rubra*), which is common in gardens, makes burrows and chambers under stones, or in the ground under roots, and the spade often disturbs a peaceful colony.

The dusky turf ant (*F. cespitum*) selects a tuft of long grass, the stems of which serve as supports to a slight tenement consisting of small grains of earth, clay, and sand, piled up without any other cement than water, or the dew and moisture of the ground, which produces a sufficient degree of adhesion between the particles. The whole forms a little hillock, underneath which are galleries and chambers. The sanguinary ant, common on the continent (*F. sanguinea*), makes a subterranean city, composed of galleries and chambers, excavated in the earth or clay to a considerable depth. Over their covert ways into this labyrinth is placed a thick coping of dry heath twigs and grass stems to defend it from rain and cold.

The yellow ant (*F. flava*) builds mounds, a foot or more in height, and generally in old pastures. They are composed of particles of soil, quarried from below, bits of decayed wood, &c., and are generally built during rainy or moist weather, as these ants have no other means than what the atmosphere affords of tempering their materials. These mounds are smooth externally, and contain chambers and galleries.

The nest of the fallow ant, or wood ant, a large species not uncommon in woods and pleasure grounds, presents a rude appearance: externally it looks like a hillock of earth, intermixed with bits of dried twigs, straws, particles of leaves, and as we have seen, even grains of corn, all mixed together, and forming a large coping or protection to numerous chambers arranged in separate stories, some deeply excavated in the earth, others near the centre or even the surface of the hillock; all communicating with each other by means of galleries; various passages open externally, the entrances being closed or left free, according to the state of the weather.

The colonies of the fuliginous or jet ant (*F. fuliginosa*), make their habitations in the trunks of old oaks or willows, in which with their strong mandibles they work out horizontal galleries separated from each other by thin partitions, and all communicating with each other. These excavations often resemble halls supported by multitudes of pillars, rising story above story and built of ebony, for the wood is invariably stained black, perhaps in consequence of the action of the formic acid, a peculiar secretion found in ants, and which, dissolved in water, serves the purposes of vinegar in Norway, where the ants are collected and steeped in boiling water, and thus is formed diluted formic acid.

With respect to the ants of hotter climates, the wonderful structures which they make have attracted the notice of most travellers. Some rear huge mounds; some construct large edifices in the forks of trees; some glue leaves together so as to form a purse; some excavate the branches of the trees, working out the pith to the extremity of the slenderest twig.

Wars and Expeditions to capture Slaves.—Ants of the same or of different species often assail each other when they meet during their foraging

excursions; but besides these individual skirmishes, pitched battles are sometimes fought betwixt rival colonies, in which thousands of combatants are engaged, and the carnage is great in proportion. But what is still more extraordinary, there are certain ants common on the continent, viz. the amazon ant (*F. rufescens*), and the sanguinary ant (*F. sanguinea*), which make war on ants of different species, viz. the dusky ant (*F. fusca*), and the mining ant (*F. cuniculuria*), not merely for the purpose of gratifying a propensity to combat, but to make slaves of the vanquished to do the drudgery at home, of which they are themselves, at least as far as the amazon is concerned, incapable. They proceed to the devoted colony in battle array, and are certain to prove victorious: they do not capture the adults, but the eggs and larvæ; these are carried off to their citadel in triumph, and committed to the care of slaves of their own species, themselves in due time to work for their conquerors and rear up fresh supplies of captives. These slaves are really the preservers of the colony, the neuters of which, those of the sanguinary ant excepted, are fitted only for fighting. Thus a colony of amazon ants requires the assistance of another species to act as servants or bond-slaves, who are essential to the very existence and continuance of their captors, whose young they nurse, and for whom they forage for food, whose habitations they repair or enlarge, and whose comforts depend upon their exertions.

(Huber's *Recherches sur les mœurs des Fourmis indigènes*, 1810; Latreille, as quoted above; Kirby and Spence, *Introduction to Entomology*.)

We may here observe that the termite ant belongs to the order Neuroptera, and is perfectly distinct from the true ants, though it resembles them in many points of their economy.

ANT-BEAR (*Myrmecóphaga jubata*). [ANT-EATER.]

ANT-EATER (*Myrmecóphaga*, Linn.). The ant-eaters are all peculiar to South America; they are hair-clad animals of the Edentate order, utterly destitute of teeth, and represented in India and Africa by the pangolins or scaly ant-eaters. The Linnæan genus *Myrmecophaga* constitutes a small but distinct family, of which we may take the following animals as the representatives.

The Great Ant-Eater, or *Ant-Bear* (*M. jubata*), is the *Tamandua* of the Portuguese and *Tamanoir* of the French. In this large toothless animal, a native of Guiana, Brazil, and Paraguay, the head is narrow, with an extremely slender elongated snout, the mouth being a small slit at the extremity. The tongue is long, cylindrical, and extensile; it is lubricated by a viscid saliva, and is an efficient instrument in the acquisition of insect food. The eyes are small, and deeply set, with a naked eyelid; the ears are short. The body is robust, and the limbs extremely muscular; they are furnished with huge hook-like claws; those on the anterior feet are four in number, the inner claw being the smallest; on the hind feet there are five claws. The claws of the fore feet, when the animal is walking, are naturally doubled inwards on a rough callous pad, and the outer portion of the fore feet only is applied to the ground. The claws of the hind feet are short, and the sole is a naked protuberant pad. The tail is very long, and is thick to the base; it is furnished with a profusion of long coarse flowing hair a foot in length, which hangs like a full deep fringe: on the head the hair is short and close, but on the rest of the animal it is long and shaggy, particularly on the top of the head and down the back, where it forms a kind of long mane. The general colour is grizzled brown; but an oblique black band bordered with white crosses the chest and passes over each shoulder to the flanks. The length of a full-grown specimen, exclusive of the tail, is about four feet and a half, and the tail is nearly three feet long, without taking the hairs into the account.

As many mistaken ideas have been entertained relative to the habits and manners of this species, we shall make a concise abstract of a very interesting paper on the subject by the traveller Dr. Schomburgk in the 'Proceedings of Zool. Soc.' 1839, p. 21.

At a distance the ant-eater appears to be taller than it really is, from the erect hair of the mane, and the mode in which it carries its tail; it walks on the outer portion of the fore feet, and instead of being slow, runs with a peculiar trot, keeping a horse on the canter in the pursuit; nor does it readily tire. White ants or termites constitute its chief food, and these it obtains by pulling down their solid fabric by means of its large strong fore claws. In picking up the ants the movements of its tongue, which is alternately protruded and retracted, are so rapid, that we cease to wonder how so large an animal can satiate its appetite with such small insects; it swallows much of the material of which the termites' tumulus is constructed, and will hold large lumps in one foot, while it pulls them to pieces with the other, and picks up the insects thus dislodged. Other insects are also its prey, and in captivity it will eat fresh meat finely minced. The ant-eater makes no burrow, its ample tail being its sole protection against the weather. When at rest, it usually tucks its feet under its belly, assumes an arched form, with the head buried underneath, and the tail forming a covering; sometimes it curls up like a dog. The female possesses two pectoral teats, and produces only a single offspring at a time, which she carries firmly fixed on her back for the space of a year. If the mother be attacked she raises herself upon her haunches, and resting one fore foot on the ground, strikes with the sharp claws of the other foot at her assailant; if the danger increase, she throws herself upon her back, and strikes with both claws; should she succeed in throwing her arms round her adversary and fixing her claws in its flesh, she holds it with a rigid gripe, and the jaguar is said to have perished not unfrequently in the combat; sometimes both have been killed.

M. Schomburgk procured a young female ant-eater, which, though at first it struck and growled, soon became domesticated, showing great attachment to its attendant, whom it followed like a dog. It attracted attention by uttering a whining sound, and was fond of being nestled up in a blanket; it directed its course more by smell

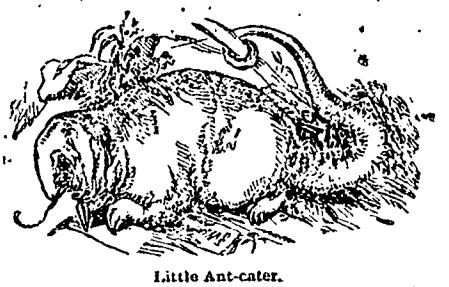
than by sight, carrying its snout to the ground, and recognising by its powers of scent its especial favourites. It was a very expert climber, and would even mount up a blanket suspended on purpose for it. It showed its attachment by licking like a dog, and was gentle and sportive: it slept much; and fed on milk, cassava, and white ants. Owing apparently to some change in its diet, milk being no longer procurable, it died, becoming previously cold and stiff. It had been two months in captivity. An adult female was subsequently procured by the same traveller, which soon became perfectly domesticated, and fed on ants, a preparation of cassava root, minced flesh, and fish; in feeding it kneeled as sheep often do, used its paws with great address, climbed up palings with the utmost ease, and when not asleep would sit on its haunches snuffing the air: it drank but little, but its mouth and nostrils were always lubricated with saliva. The males of this species are very seldom to be met with, being perhaps more recluse than the females, if not really less numerous. The flesh of the ant-eater is regarded by many of the native tribes, and also by the negroes, as a delicacy. The upper lip and nostrils of the ant-eater are remarkably flexible; and in the selection of its food it trusts chiefly to the sense of smell, which is exquisite; its sight, on the contrary, is dim. Buffon, on the authority of Laborde, says that these animals climb trees. This has been denied, but of their capability to do so M. Schomburgk had ample proof. They frequent low savannahs and dense forests.

Great Ant-Eater.

The *Tamandua* (*M. Tamandua.*)—Though the terms *Tamandua* and *Tamandu* are names of the preceding species, called by the Brazilians *Tamandua Bandeira*, the word Tamandua is appropriated by European naturalists to an arboreal species much inferior to the Great Ant-Eater in size, and a native of the primeval forests of tropical America. In this species the muzzle is more abbreviated, and the snout more conical and less tubular than in the former animal; the fur is in general comparatively short, wiry, and glossy, and the tail, which is destitute of a flowing brush, is long, taper, thinly clad, prehensile, and naked at the tip. The eyes and mouth are small, the tongue capable of great extension; the nostrils are lateral slits; the ears small and rounded. The limbs and feet present the same conformation as those of the great ant-eater. The Tamandua measures about two feet in length, exclusive of the tail, which is one foot four or five inches. This ant-eater is mostly found in trees, and aids itself in climbing by its prehensile tail; it feeds on ants, termites, and, as Azara states, on bees which form their hives among the loftiest branches of the forest and have no sting. During repose it hides its muzzle in the fur of its chest, falls on its belly, and wraps itself round with the tail. The female has two pectoral teats, and produces a single offspring at a birth, which clings to her back and is carried for several months. The young are said to be very ill-formed and ugly.

The Tamandua has a disagreeable musky odour, especially when irritated. Several varieties of Tamandua, perhaps distinct species, are described; some are black, others straw-coloured; some silvery white, with a band over the shoulders; but how far these differences may depend upon age is not yet ascertained.

The Little Ant-Eater (*M. didáctyla*).—The little ant-eater forms the type of a distinct genus. It is characterized by the shortness of the muzzle, which is conical; by the number of the claws, which are two on each forefoot, of hook-like shape, compressed laterally, and very sharp, the outer one being considerably the longest; and by the hind feet having an oblique direction, and being armed with four short compressed claws. The tail is long, powerfully prehensile, and naked for three inches on the under surface at the tip. The claws of the fore feet resemble, in a great measure, those of the sloth, and are folded down on a callous pad; these, aided by the inward tournure of the hind limbs, and the prehensile structure of the tail, fit the animal for its arboreal residence. It possesses clavicles, which do not exist in the great ant-eater or in the tamandua. The eyes are small; the ears close and buried in the fur; the mouth small, the tongue vermiform. The fur is exquisitely fine, soft, curled, and silky. The general colour is golden-brown, with a brownish mark on the back, often wanting. Length of head and body, ten inches; of tail, ten inches and a half. This beautiful little animal is a native of Guiana and Brazil, where it lives in the forests, suspending itself by its long tail, and clinging to



Little Ant-eater.

the branches by means of its claws. It searches for insects amongst the fissures of the bark, and feeds on the nymphæ or grubs of wasps, attacking the nests, pulling out the insects with its fore claws or nippers, and sitting up to devour them in the attitude of a squirrel. In defending themselves these animals strike with both their fore-paws at once, and with considerable force; they are nocturnal, and sleep with the tail twined around their perch. They utter no cry. The female is said to make a bed in the hollows of trees, and to produce a single young one at a birth. We have seen a pale variety, which some regard as a distinct species.

ANTACIDS, from the Greek word *ἀντί*, 'against,' and the Latin word *acidus*, 'acid,' signify medicines used to correct acidity in the stomach. Though hydrochloric acid (formerly called muriatic acid, or spirit of salt) is present in a free state in the stomach during the process of healthy digestion, yet under particular circumstances it is apt to be generated in excess. Other acids are also occasionally evolved in the stomach, probably from the fermentation of the articles, as vegetables and fruits of different kinds, by which the acetic acid is produced, or introduced ready formed, in wines or hard beer, and in certain vegetables, as sorrel, which contains oxalic acid. The most frequent source of acidity is that first mentioned, the secretion of acid by the vessels of the stomach. It is, therefore, dependent upon constitutional causes, or the state of the system generally.

The medicinal means of remedying this state are all alkaline, either the pure alkalies, or some combination of them—such as solution of potash, or carbonates of soda, potash, magnesia, ammonia, or lime. These medicines are called Antacids.

ANTÆ, a term used by architects to designate the pier-formed ends of a wall, as in the terminations of the lateral walls in a Greek temple, where a plain face returns on each side, having some relation in general proportion to the columns with which they compose. The antæ (for the word is used alike in the singular and in the plural) has a moulded and otherwise enriched cap or cornice, and generally a moulded base. The moulded caps and bases of antæ are, in Greek works, generally continued along the flank walls so as to form the cornice and base of the whole wall, and not of the protruded faces of its ends alone. In Roman works, and in modern imitations of both, breaks are often made on the face of a wall with the caps and bases of antæ, but more frequently with those of columns, and these are called pilasters. In classical Greek works, and in the best Roman works, antæ and pilasters are never either diminished or fluted.

ANTAGONIST MUSCLE, from *ἀντί*, against, and *ἀγωνίζομαι*, to strive—a muscle, the action of which is opposed to that of some other muscle. Muscles are the instruments by which, in the animal body, motion is effected. The object of each muscle is to produce some specific motion: among the various motions which are needed in the animal economy, it necessarily happens that some are directly opposite to others, and the muscles which accomplish these directly opposite movements are said to be with relation to each other *antagonists*.

ANTALCIDAS. [Agesilaus.]

ANTALKALIES, from *ἀντί*, 'against,' and *alkali*, are means of counteracting the presence of alkalies in the system. Such remedies consist of the various mineral and organic acids.

ANTALO. [Abyssinia.]

ANTAR, an Arabian warrior, best known to Europeans as the hero of a romance, translated into English, in 1819, by Mr. Hamilton, oriental secretary to the British embassy at Constantinople. The hero is not a completely fabulous person: he was the son of an Arabian prince, by a negro slave. Born, therefore, to his mother's condition, and for a long time disowned as an Arab, and ill-treated by his father, he yet raised himself to high consideration by his extraordinary strength, courage, and poetical talent. He lived at the close of the fifth and beginning of the sixth century. The romance of 'Antar' is curious, as presenting an early picture of the manners of the Bedouin Arabs; but there is too much sameness in it to render it, in its English form, very interesting to the reader.

ANTARCTIC CIRCLE. [Arctic Circle.]

ANTARCTIC SEAS and REGIONS. [Polar Regions, South.]

ANTARES, a name given to the bright star marked *α* in the constellation Scorpio.

ANTECE'DENT, a mathematical term used in proportion, meaning the *first* of the two terms of a ratio, in opposition to the *consequent*, or second term. Thus, in the continued proportion:—

2 : 4 : : 3 : 6 : : 4 : 8 : : 5 : 10, &c.,

2, 3, 4, 5, &c., are antecedents; 4, 6, 8, 10, &c., are consequents.

ANTECEDENTIA. When a heavenly body moves contrary to the order of the signs of the zodiac—from Gemini to Taurus, from Taurus to Aries, &c.—it is said to move *in antecedentia*. When it moves according to the order of the signs, it is said to move *in consequentia*.

ANTEFIXÆ, blocks with vertical faces placed along over a cornice in ancient Greek and Roman buildings, to hide the ends of the covering or joint tiles, and their faces are generally ornamented with a flower, leaf, or other enrichment.

ANTELOPE (*Antilope*, Pallas), a very extensive group of ruminating quadrupeds (order *Ruminantia*, class *Mammalia*), belonging to the hollow-horned (not antlered) series, respecting the divisions or genera of which various naturalists entertain different opinions. It must be confessed, indeed, that some of the animals termed antelopes, as the Prongbuck of North America, the Cambing-outan of the hill-forests of Sumatra, and the Chamois of the Alps, are in general form and habits closely allied to the goat tribe; while others, on the contrary, of large size and massive contour, as the Canna or Eland of the Dutch colonists of South Africa, the Hartebeest of the Cape, and its ally the Bekr-el-Wash (wild ox of the Arabs), common in northern Africa, approximate in many points to the bovine or ox family. Looking again at the Gnus of South Africa, we at once find ourselves perplexed;—in some respects they approach

the buffalo—the neck, mane, and tail resemble those of the horse, and the general action is more like that of the horse than that either of the ox, the goat, or the elegant gazelle. The Nyl-ghau of India presents us with a very singular form; and the bush antelopes, formed for diving through the dense brush and jungle, have their peculiar characters. Why should we call all these antelopes? The term is of uncertain origin, given at first probably to a fabulous animal, or, if indicative of any species, of the gazelles only. It first occurs in the Hexameron of Eustathius (4th century), and Bochart supposes it to be derived from the Coptic Panthalops, which signifies the unicorn; and it has been erroneously supposed to be a Greek compound framed with reference to the large eyes of the gazelle, so celebrated by the poets of Arabia and Persia. Again, some antelopes, if we must use the word, have a broad naked muzzle like the ox, which fits them for grazing on the pasturage of plains and meadows. Others have the muzzle attenuated and hairy like the goat, and browze upon plants or nibble the herbage; sometimes we find an intermediate form between these two extremes. In many species the females have only two teats, in others they have four; in some the females are destitute of horns; in others the females differ much both in contour and colour from the males.

Like the stag and the fallow deer, and the sheep also, many antelopes possess lachrymal or suborbital sinuses, often called tear-pits, consisting of a sac or fold of the skin beneath the eye, furnished at the bottom with a gland which secretes an oily viscid substance closely resembling carwax; these pits, of greater or less extent, are capable of being opened or closed; but their precise use is not known; they do not communicate with the internal nostrils, as some have supposed, and consequently have nothing to do with respiration. In some species these sinuses are wanting; so are they in the goat, though not in the sheep. In some antelopes a naked glandular stripe runs down each side of the face, and secretes a dark oily substance. In most species inguinal pores are present; these are deep cutaneous sacs situated in the groin, secreting a glutinous waxy substance. In one species, the chamois, there is a pit behind each ear; it is nearly half an inch in depth, and opens externally by a small aperture; its use is unknown. Interdigital pits are commonly present.

The antelopes are generally covered with smooth short hair; some have a mane along the ridge of the neck; in certain species there are tufts of hair called *scopæ*, or knee-brushes, below the knee-joint of the anterior limbs. The ears are usually long and pointed, and the tail is short, often tufted. Generally speaking, these animals are gregarious, wandering in herds in search of pasturage, and are thus partially migratory. Some live in pairs, or small families only. They are timid, watchful, and cautious, and enjoy the senses of hearing, sight, and smell in great perfection. Africa may be considered as the head quarters of the antelopes. Out of about seventy known species, upwards of fifty inhabit the continent of Africa alone; two or three are common to it and Asia; about a dozen are peculiar to Asia; two inhabit Europe, and one, the prongbuck, is found in North America. The precise nature of the locality tenanted by the various species is very different. Wide plains, the steppes of central Asia, the karroos of Africa, mountain ranges, deep woods, and dense jungles, have all their appropriate species.

The subdivisions of this extensive group are very differently framed by various naturalists, among whom Col. Hamilton Smith (in Griffith's translation of the 'Règne Animal'), and Mr. Ogilby (in 'Proceedings Zool. Soc.,' 1836), have done much towards a lucid and satisfactory arrangement. We shall here only attempt a sketch of the views of Mr. Ogilby, giving at the same time the most prominent examples.

I. Horns moderate, scabrous, hooked backwards at the tip, with a prong about the centre, directed forward. No horns in the female, teats four, muzzle hairy, suborbital and inguinal pores wanting; fore knees with large brushes; accessory or false hoofs wanting.

Example, the Prongbuck (*A. furcifer*). This species, the only one of the present section of which we have any certain knowledge at present, inhabits the western parts of North America, from 53° N. lat. to as far S. as the plains of Mexico and California. It is numerous on the southern branch of the Saskatchewan, and the upper plains of the Columbia river. It is gregarious, associating in troops which frequent the open country, never resorting to wooded districts; they migrate from north to south according to the season, and are swift and timid, but at the same time curious and inquisitive, wheeling round in circles to scan the object of alarm, and thus often come within the gun of the hunter, and fall a sacrifice to the artifice of the wolf.

The Prongbuck stands about three feet high at the shoulder; the tail is short, the limbs long, and the general figure graceful. The body is thickly

Prongbuck.

covered with long hair, dry, harsh, brittle, tubular, and utterly devoid of elasticity. The general colour is fawn in winter, with a white disc

around the tail. In summer the coat has a darker tinge, and the hair appears of the ordinary texture, its character becoming altered on the approach of the cold season. (Richardson's 'Fauna Boreali-Americana.')

II. Horns simple, none in the female; lachrymal sinuses, inguinal pores, and knee-brushes wanting. Teats two. Muzzle hairy.

Example, the Chiru (*A. Hodgsonii*, Abel). This species, the only one known as yet of the present group, inhabits the elevated plains of Tibet, but never approaches the mountains. It associates in herds of hundreds on the open plains, with sentinels posted in different directions, and is extremely shy, wary, and swift. During the summer, vast herds, under their respective leaders, visit the salt-beds which abound in Tibet, and take every precaution to prevent surprise. When brought to bay, the males defend themselves with great desperation. The chiru stands three feet high at the shoulders, and the general contour indicates vigour. The horns are long and strongly compressed on the sides, they bend slightly backwards at first, and afterwards point gradually forwards, thus assuming a lyrated form. Two large fleshy tumours grow close to the margin of the nostrils, and a pendent pouch hangs by a loose narrow neck in each groin. The body is covered with an under coat of close wool, and a long external coat of hair. The general tinge is tawny, but the under wool is of a greyish blue. ('Proceedings of the Zoological Society,' 1831, p. 52; 1832. p. 14; 1834, p. 80.)

III. Horns round, annulated, and more or less spiral, in the male only. Large suborbital sinuses; large inguinal pores. Muzzle hairy. In most, long knee-brushes. Teats two or four.

The best known example of this section is the Sasin or Common Indian Antelope (*A. cervicapra*), so frequently to be seen in our menageries. This species, remarkable for the spiral twist of its ringed horns, is found in every part of India, and is remarkable for its extreme fleetness and its wonderful agility. Captain Williamson states, that he has seen an old buck antelope lead a herd of females over a net at least eleven feet high, and that they can pass over ten or twelve yards at a single bound. These antelopes reside in the open plains, living in families consisting each of fifty or sixty females and a single male, exclusive of a number of young bucks, which are stationed around the herd as sentinels. On the least alarm the whole troop is in rapid motion, and the swiftest dogs are left far behind. The chetah, or hunting leopard, is trained to pounce upon these antelopes by surprise, but often misses his aim; the hawk is also used, but not flown at the males, on whose horns it would be soon transfixed; it harasses and impedes the animal, giving time for the dogs or the hunter to come up. The long sharp horns of the sasin are used as weapons by the fakirs and dervishes of the East.

Under this group is placed the Saiga (*A. colus*), a native of the open steppes and deserts from the Danube to the Irtish eastwards, and as far northwards as 54° lat. It is found in Poland, Moldavia, Siberia, and Northern Persia. Its Polish name is *sulak*, and the Tartars term it *alkak*. It is gregarious and migratory in its habits, and feeds upon acrid, saline, and aromatic plants.

Another species is the Dzeren (*A. gutturosa*), a native of the dry arid deserts of central Asia, Tibet, China, and Southern Siberia, particularly the great desert of Gobi, where it feeds upon a scanty herbage, avoiding water. It is fleet, active, and gregarious, the troop following their leader in single file, even when hotly pursued. They are a favourite object of the chase with the Moguls and Tartars, their flesh being esteemed as food. In the old males the larynx is enlarged and salient, forming a prominent lump on the throat; hence the title *gutturosa*. The female produces a single kid in June. We may here just notice that magnificent antelope of Southern Africa, called the Pallah (*A. melampus*), a native of the wide open plains, where it congregates in small families. It is extremely swift, powerful, and active, and much hunted for the sake of its flesh.

IV. Horns short and straight; knees without brushes; hips hairy; circular lachrymal sinuses, but no inguinal pores; teats four.

The example of this section is the elegant active little Madoqua (*A. saltiana*), scarcely 14 inches high, found in all parts of Abyssinia, and especially the mountain districts of Tigré, where it lives in pairs. The female has no horns, but a tuft of hair standing upright on the crown of the head, as has the male also. Of the habits of this species little is known.

V. Horns moderate and lyrated, in the male only; suborbital sinuses large; knee brushes; inguinal pores?; teats two; muzzle round and naked, like that of the stag.

Of this group two species are described, *A. forfex* of Col. H. Smith, and *A. adenota*, of the same. Both are believed to be natives of Western Africa; at least one living specimen, the only one yet seen, of the former, and a living pair of the latter, were brought from the western coast. They were very shy, wild, and timid. Little is definitely known respecting them.

VI. Horns four in number, in the male only; muzzle naked and round; large lachrymal sinuses; no knee-brushes; teats?; inguinal pores.

The Chickara, or four-horned antelope (*A. quadricornis*), is a small species, standing one foot eight inches in height; the upper pair of horns are straight and about three inches long; the additional pair in front of these are still shorter and blunt. This species lives in pairs in the wooded parts of India, particularly in Bengal, Bahar, and Orissa: it is exceedingly wild and active, and unless when taken very young, will not bear confinement. The female produces two young at a birth.

VII. Horns in the male only, short, round, smooth, and bent slightly forwards; muzzle naked; lachrymal sinuses large; teats four; inguinal pores generally present; knee-brushes mostly wanting.

Under this group are arranged the Nyl-ghau (*A. picta*); the Ourebi of South Africa (*A. scoparia*); the Steenbok (*A. tragulus*) of South Africa; the Grysbok (*A. melanotis*) of the same districts; the Klipspringer (*A. oreotragus*) of the craggy mountains of the Cape; a species from

India termed *A. aculicornis* and an allied species termed *A. subulata*.

Of all these the Nyl-ghau is the most remarkable. It is upwards of four feet high at the shoulder, and extremely powerful. This noble animal inhabits the dense forests in India, where, notwithstanding its great strength and spirit, it often falls a prey to the tiger: when, however, chased by man, it frequently turns furiously upon the hunter, who finds a difficulty in evading its sudden onset. The nyl-ghau has often bred in captivity, both in this country and in India. The male is vicious, and not to be approached without caution. The sexes differ in stature and colour, the general colour of the male being slaty blue, of the female tawny red.

Nyl-ghau.

VIII. Lachrymal sinuses absent; horns large and spiral, with a prominent wreath; none in the female; muzzle naked; inguinal pores, but no knee-brushes.

Of this group the huge Koodoo (*A. strepsiceros*)

Koodoo.

is the most striking. Its spiral horns are often four feet in length, and beautifully twisted. The male is four feet high at the shoulders. This noble antelope inhabits the woody parts of Caffraria, principally along the banks of lakes and rivers; it swims well; it is generally found in small families of four or five individuals, and feeds on the shoots and leaves of young trees.

The Boshbok (*A. sylvatica*), a native of southern Africa, is placed in this section, and so is the Guib of western Africa (*A. scripta*).

IX. Horns in the male sex only distinguished by a single curvature towards the point; muzzle naked; inguinal pores large; neither lachrymal sinuses nor knee-brushes; teats four.

Several species, all African, are included in this group, as the Koba (*A. koba*), the Kob (*A. kob*), the Reitbok (*A. eleotragus*), the Nagor (*A. redunca*), the Rheebok (*A. capreolus*), &c.

The Koba, called *Grande Vache brune* by the French, is a native of Senegal, and about the size of the ordinary stag of Europe. It is covered with long and rough hair, of a reddish hue on the upper parts, passing into grey below. In captivity the Koba is very gentle, but of its habits in a state of nature nothing is known. Some years since, a specimen (female) lived for a considerable time in the gardens of the Zoological Society, London. This species exceeds the Kob in size; this latter is the *Petite Vache brune* of the French of Senegal.

X. Maxillary naked glands; sometimes, also, lachrymal sinuses; horns round, short, slightly annulated, and common to the male only; muzzle naked; large inguinal pores; teats two.

In this section are placed the Cambing-outan (*A. Sumatrensis*) of Sumatra, the Four-tufted Antelope (*A. quadriscopa*) of Senegal, the Bush antelope (*A. silvicultrix*) of Sierra Leone, the Duikerbok (*A. mergens*) of the woods of Caffraria, and a few allied bush-diving species.

The Cambing-outan, or wild goat of the Malays, inhabits the hilly forests of Sumatra, and is very active and sure-footed, with much of the general aspect, habits, and manners of the goat or the ibex. It is vigorously made, and covered

Cambing-outan.

with long dark-brown hair, contrasted with a full white mane. The horns are short and slender.

XI. Horns in both sexes; muzzle naked; maxillary glands without lachrymal sinuses; teats four.

The animals of this group are all African, and live singly or in pairs, among the brushes or underwood, and rarely venture to quit the thick cover of the woods and forests: all are of small size. We may mention the Grimm (*A. Grimmia*, Desmar., not Pallas), a native of Sierra Leone and Guinea. The Kleenebok (*A. perpusilla*, H. Smith), found in the thick brushes of South Africa; and the Guevi (*A. pygmæa*, H. Smith), an inhabitant of Senegal. Several other species are imperfectly known.

XII. Horns ringed and lyrate, common to both sexes; muzzle hairy; suborbital sinuses; large inguinal pores; knee-brushes; teats four.

This group includes the light and elegant gazelles which live on the wide plains of Syria, Arabia, western Asia, and northern and southern Africa. The common Gazelle of Barbary and the Sahara (*A. dorcas*), the Ariel Gazelle of Arabia and Asia Minor (*A. Arabica*), the Kevel of Senegal (*A. Kevella*), Sœmmering's Gazelle (*A. Sœmmeringii*) of northern Abyssinia, the Springbok of Caffraria (*A. euchore*), and the Blessbok of South Africa (*A. pygarga*), are the most prominent examples.

As a characteristic specimen of this rapid light-limbed group of gregarious antelopes, we figure the Blessbok (*A. pygarga*), also called Bontebok, a native of the plains of South Africa, remarkable for the pure white of the chaffron and of the croup, contrasting with the brilliant brownish bay of the upper parts generally.

Blessbok.

XIII. Horns larger than in the true gazelles, with bolder curvatures, reclining first backward, and then turning suddenly forwards; common to both sexes. The other characters as in the preceding group.

To this group belongs the Mhorr Antelope (*A. mhorr*), from the deserts of Mogadore; the Nanguer (*A. dama*) of Senegal; and the Addra (*A. ruficollis*) of Sennaar and Dongola. These are all light, fleet, and beautiful.

XIV. Horns in both sexes, smooth and black, at first rising upright, and then suddenly hooked backwards; lips hairy; a sinus or pit at the root of each horn; no lachrymal sinuses; teats two.

The only species in this section is the Chamois (*A. rupicapra*), a native of the Alps, the Pyrenees, the Carpathian and Grecian mountains, and the mountain-chains of Caucasus and Taurus.

The habits of the rock-bounding chamois have been so often detailed, and are so generally known, that we need not repeat them. Its acuteness of hearing, sight, and smell, its security on the slightest ridge of the towering crag or precipice, its wonderful activity and address, have been long celebrated; its chase demands the utmost nerve, daring, and powers of endurance, insomuch that the life of a chamois-hunter is one of perpetual jeopardy. This animal is much rarer than formerly in the Alps and mountain-chains of Europe.

XV. General form heavy, solid, and massive, like that of the ox tribe, to which the animals of this section approximate in many points. Horns in both sexes long, erect, straight, or slightly curved back; sometimes twisted into a beautiful spiral of two or three turns. Muzzle partially naked; no suborbital sinus, nor inguinal pores; teats four.

To this group belong the Addax (*A. addax*) of Bornou, Dongola, and central Africa generally; the Abu-Harb (*A. leucoryx*) of Sennaar and Kordofan, where it lives in large herds; and of which delineations are common on the ancient monuments of Egypt and Nubia; the Algazel (*A. gazella*), of which little is known; and the Gemsbok (*A. oryx*) of the plains of Southern Africa.

The Addax is about the size of a large ass, with a heavy head, thick neck and legs, and switch-tail. The horns are round, rather slender in proportion to their length, twisted outward,

Abu-Harb.

and describing two turns of a whole spiral. In the female they are smaller than in the male. The addax lives in pairs on the sandy deserts of

Central Africa, and appears to have been known to the ancients; it is the *strepsiceros* of Pliny, which he says the Africans call addax. (Pliny, 'Nat. Hist,' xi., c. 37, ed. Hard.) The Arabs of the present day term it *akasch, akas*, or *addas*, with the addition of *Abu*, father. The Abu-Harb is the *Oryx* of the Greeks and Romans; but this name is now bestowed by naturalists on its South African relative.

The Abu-Harb is a large and powerful animal, with the horns, which are long and sharp, slightly bent backwards.

XVI. Characters as in group XV.; but the muzzle more completely naked.

To this section belongs the Blauwbok (*A. leucophæa*) of Southern Africa, where it lives on the open plains north of the Orange River, in pairs or small families. The male is three feet seven inches high at the shoulder, and is often very dangerous, attacking man and beast. The long sharp horns bend gently backwards. The Takhaitze (*A. barbata*) of Southern Africa, superior in size to the former, is extremely dangerous. The Equine Antelope (*A. equina*), a large species, inhabits the low wooded hills of South Africa. The Ellipsiprymnus (*A. Ellipsiprymnus*, Ogilby), of which a detailed account will be found in the 'Proceedings Zool. Soc. Lond.,' 1833, p. 47, is a native of the interior of South Africa.

XVII. Horns in both sexes spiral, or surrounded by a spiral wreath; muzzle large and naked; hanging dewlaps; teats four. No lachrymal sinuses, nor inguinal pores.

This group contains the Canna or Eland (*A. oreas*), and the Baastard Eland of the Dutch (*A. canna*), both natives of South Africa.

The Canna, or as it is improperly called, Eland, is the largest of all antelopes, equalling a good-sized horse in stature. Its form is massive, and its withers are high. The tail terminates in a tuft. This animal often becomes very fat, and weighs from seven to nine hundred weight; it is mild, sluggish, and heavy, and is soon fatigued. Its flesh is highly prized; and the muscles of the thighs, when cured and dried, are sold as a delicacy under the name of thigh-tongues. This species lives in large herds upon the open plains and low hills, the males usually feeding apart by themselves. It is much harassed by the hunter, and is now scarce, except in the more retired parts of the Cape Colony.

XVIII. Short, upright horns, bent backwards, in both sexes; muzzle naked; teats four; no lachrymal sinuses, nor inguinal pores.

To this section belongs the Goral (*A. goral*, Hardwicke), first described in the 'Linn. Trans.' This antelope lives in large herds upon the elevated plains of the cold regions of Nepaul, which form the lower ridges of the great chain of the Himalayan Mountains. It is wild and fleet, and easily escapes from the hunter, unless he use stratagem; its flesh is much esteemed. According to Mr. Hodgson ('Zool. Proceedings,' 1833, p. 105), its name should be written *ghörül*, not *goral*.

XIX. Horns common to both sexes, short, parallel, slightly curved back; large suborbital sinuses; no inguinal pores; teats four; muzzle naked.

This section contains a singular species, the Thar. (*A. thar*, Hodgson), described in 'Proceedings Zool. Soc.' 1834, p. 86, 99. This animal is goat-like in form and habits, and covered with coarse black hair; it is heavily made, and stands upwards of three feet high at the shoulders; its limbs are strong, short, and admirably adapted for climbing the steep sides of the craggy mountains. 'The Thar inhabits the precipitous and wooded mountains of the central region of Nepaul, up and down which it rushes with fearful rapidity, though it does not spring or leap well; nor is it speedy.' (Hodgson.)

XX. Horns heavy, thick, annulated, first inclining forwards, and then suddenly bent backwards; muzzle small; lachrymal sinus represented by a small gland on the surface of the skin; horns in the females; teats four; habits gregarious.

In this section are placed the Bekr-el-Wash, or wild ox of the Arabs (*A. bubalus*), the Caama or Hartebeest (*A. caama*) of South Africa; and the Sassaby (*A. lunata*), also of South Africa.

The Bekr-el-Wash is figured on the monuments of ancient Egypt. It is common in many parts of Northern Africa, and lives in large herds. It is quiet and familiar, frequently mixes with domestic cattle, and becomes tame and docile. The male fights like the common bull, lowering his head and striking with his formidable horns. The form is heavy; the head is long and narrow, and the forehead and chaffron straight. In size this species exceeds the largest stag, but is more heavily made.

Bekr-el-Wash.

The Caama of South Africa is a closely allied species, and a favourite object of pursuit for the sake of its flesh. The Sassaby is rare.

XXI. Horns common to both sexes, expanding at their base so as to form a solid helmet across the forehead; from this base they curve downwards anteriorly, and then sweep suddenly upwards; ending in sharp points. Head heavy; muzzle broad and expanded on each side into a

thick, muscular flap, covering each nostril like a lid or valve. Lachrymal sinus reduced to a small external gland; no inguinal pores; mammæ two.

Three singular species, of large size, are included in this section; their form is very remarkable; the head and horns are those of the Cape buffalo; the neck, tail, and mane, those of the horse; the body and limbs those of the stag. These species are gregarious, and inhabit the plains of Southern Africa, to an unknown distance into the interior. They are the Gnu (*A. gnu*), the Kokoon (*A. taurina*), and the Brindled Gnu (*A. gorgon*).

The Gnu equals a pony in size; and, indeed, a herd of these animals seen on the Karroo at a distance might be taken for a troop of quaggas. They are wild, suspicious, and fierce; and a leader heads the collective body, which, when alarmed, follow in single file. A gnu, when wounded and closely pressed, turns very savagely upon the hunter, tossing its head, and striking violently with its horns, or dropping on its knees, and then darting forward with terrible force and rapidity.

Gnu.

Of the other two species less information is known; though in most respects they agree with the former. The three species, however, never associate together.

(*Proceedings of the Zoological Society; Catalogue of Mammalia in British Museum*)

ANTENNÆ, horn-like members placed on the heads of insects and crustacea, and peculiar to those animals. The term was applied by the Latins to the sail-yards of a ship, and is borrowed by zoologists and used in this peculiar acceptation. The antennæ are uniformly two in number in insects, but in crabs and lobsters they are more in number. They are connected with the head always near the eyes, by means of a ball (*bulbus*) and socket (*torulus*). They are composed of minute cylinders or rings successively added to each other, to the number of thirty in some butterflies; thus they form a tube which incloses nerves for sensation, muscles for moving, as well as air-pipes and cells. (Straus-Dürckheim's work 'On the Anatomy of the Cockchafer.')

The form of the antennæ is exceedingly various, some being simple, some feathered, some clubbed, and others comb-shaped, and so on *ad infinitum*. They vary also in length, and comparative stoutness. In some beetles they far exceed the length of the body; but their length does not depend on the number of the separate joints, for they may be long and yet consist of but few, and short while composed of many.

With respect to their functions nothing is decidedly proved: in the higher crustacea, as the lobster, there are distinct organs of hearing placed at the base of the larger antennæ, where a tympanic membrane may be seen stretched across a little pit, with an elevated margin. That insects hear may be readily believed; they utter or produce sounds by way of calls to each other, as we may notice in the cricket, grasshopper, tree-hopper, death-watch, and others, and judging from analogy it is at least very probable that the auditory nerves are those of the antennæ, or at least are seated at their base; and this opinion is advocated by Réaumur ('Mém. des Insectes,' i. 643) and Bonsdorff, who adduce many circumstances in its favour. In some species the antennæ appear to be used as feelers. If we watch one of the ichneumon flies traversing any surface, we shall observe its antennæ in rapid motion, touching again and again the ground before it. According to the younger Huber, ants employ their antennæ as organs of communication, and by their means receive or convey information. Their antennæ enable these insects, as it is asserted, to avail themselves of numerous signals, which are understood among themselves, and this Huber terms antennal language; but whether the signals of direction, information, or greeting, are invariably made by the antennæ or not, and what those signal-motions really are, we cannot positively demonstrate. It may be that a sense unknown to man and the higher animals resides in the antennæ; but of this we have no proof; neither do we know what modification of any peculiar sense is produced by the varied forms and the multitudinous differences which the antennæ present, nor by the power of being folded up, and securely lodged, or the contrary. We cannot doubt that they are the organs of some important sense; and from the relative size of the nerves supplied to them, of a sense extremely acute; and we lean to the opinion that, whatever other sense they may possess, the antennæ are endowed in an especial manner with that of hearing; that they are constructed for appreciating the vibrations of the element around them.

ANTEQUERA (*Antikaria*), a town of Andalusia, in the province of Malaga, 37° 9′ N. lat., 4° 32′ W. long., stands in a plain surrounded by mountains. The plain is one of the richest in the province, owing to its being irrigated by the rivers Guadaljorce and Lavilla, and produces all sorts of grain, fruit, wine, and oil. The neighbouring mountains abound in fine wood, white, black, and red-marble, limestone, and gypsum. About eight

miles north-west of the town is a lake of salt-water, four miles in length and a mile in breadth, which in the summer months, from the watery particles being evaporated, becomes a solid mass of salt. The manufactures of Antequera consist of common woollen stuffs, silk, leather, paper, and soap. The population amounts to about 20,000. There are at Antequera a collegiate church, four parish churches, a seminary for the education of the clergy, an hospital, and an almshouse. Very extensive Roman remains are found at Antequera.

ANTHELMINTICS, from two Greek words, signifying means used to expel worms from the intestinal canal, and to prevent their formation. Though the origin of worms in the intestines has been a subject of inquiry and controversy for many ages, we are far from having arrived at a satisfactory conclusion respecting it. While some have regarded them as the result of what is termed *spontaneous* or *equivocal generation* occurring in the intestines (Aristot. 'Hist. Anim.' v. 19), others have maintained that they are introduced into the stomach from without, either along with our food, or in some other way, in so small a form as to be unobserved. Great difficulties attend either view of the question, but an approach has recently been made to a solution of it. Steenstrup has found ('Alternations of Generation,' translated for the Ray Society) that many animals, hitherto supposed to have been species, are only transition stages, or as he calls them 'nurses,' of the same animal; so that it is not impossible that many of the entozoa may be found to be transition stages of animals, and many of the difficulties of their generation may be thus explained.

The causes of worms, and of the tendency to their formation, may be divided into, 1, general and local, referring to the residence, and, 2, special, referring to the individual infested by them, his constitution, habits, diet, &c.

Of the first division, the most general is climate. In certain countries worms prevail more than in others; and hence their frequency in Holland, where there is no want of personal cleanliness, or attention to the food; but the constant moisture of the atmosphere, both producing general weakness, and acting hurtfully on the skin—the state of which, owing to the sympathy existing between it and the digestive organs, influences greatly the health of the body—farther predisposes to their development. We see the same causes operate in producing the rot in sheep, which is always accompanied by the presence of a worm (the *Distoma hepaticum*, or *fluke*) in the liver; and we shall find the same means prove successful in preventing their formation in both cases: as only sheep feeding in wet pastures, such as marshes, are subject to the rot. Dwelling in an impure air, where there is not sufficient ventilation, prepares the body for becoming the seat of worms, and hence their greater frequency among the crowded inhabitants of towns than among the peasantry.

The effect of these general causes is to produce a weak state of the system, the existence of which, however occasioned, seems the first requisite for the unhealthy development of worms.

The number of different kinds of worms infesting the stomach or intestines of man is not very great, but they propagate their species often with astonishing rapidity. We shall enumerate the most common sorts, following the nomenclature of Bremser, 'Lebende Würmer in lebenden Menschen.' Wien, 1819; also translated into French, by Dr. Grundler, Paris, 1828, 'Traité des Vers Intestinaux.'

The *Trichocéphalus dispar* (or *long-thread-worm*), found in the upper part of the large intestines, or cœcum; *Oxyuris vermicularis* (*Ascaris vermicularis*, the *maw-worm*, or *thread-worm*), which inhabits the rectum, or lowest intestine; *Ascaris lumbricoides* (the *large round worm*), mostly found in the small intestines; *Bothriocéphalus latus* (*Tænia lata*, the *broad tape-worm*), found in the small intestines (principally of the inhabitants of Russia, Poland, and Switzerland, seldom met with in Britain); *Tænia solium* (the *tape-worm*), in the small intestines, generally alone, but occasionally three or four together: the *Distoma hepaticum* (or *fluke*), is sometimes found in the liver and gall-bladder of man, but more commonly of sheep, goats, &c.

From what has been said above, the principles of treatment may readily be deduced: these are, to strengthen the individual, and weaken the worms, which facilitates their expulsion, and diminishes the tendency to their formation. This last is a point of great practical importance; for not only is it of little use to expel worms already existing in the intestines, unless we remove the tendency or disposition to their production, but very frequently many of the articles inconsiderately administered (which, however, are regarded as valuable anthelmintics, because, by their operation, they bring away worms), often do more harm to the individual who takes them than to the worms.

The means employed to effect the ends proposed are very numerous, but reducible to three heads: viz. those which, by increasing the peristaltic motion of the intestines, displace the worms, and often occasion their expulsion, as purgative medicines of different kinds; those which tend to increase the strength of the stomach and intestines, and system generally, as tonics or analeptics; and lastly, those which are conceived to act in an especial manner on the worms, dislodging, weakening, or killing them—or anthelmintics, in the strict sense of the word. Our means must be varied; for not only are the different kinds of worms limited to different parts of the intestinal canal, and the species of worms infesting it different at different periods of life, but particular substances are found to be more efficacious against one species than against others.

ANTHEM, in Music, a composition in use in all our choirs, set to verses from the psalms, or to any portion of the Scriptures or Liturgy; it may be for one, two, or any number of voices, but rarely exceeds five parts. The *verse anthem* has only one voice to a part, and, requiring nicety of execution, is generally assigned to the best singers in the choir. The *full anthem, with verse*, is sung by the whole choir, but the verse parts by single voices. The *full anthem* is chorus wholly, and performed by all the voices.

The English school has always excelled in the composition of anthems. Tallis led the way in full anthems, and was immediately followed by Bird and Farrant; since whose time there have appeared Orlando Gibbons, Blow, Purcell, Wise, Clark, Croft, Greene, Boyce, Hares, &c.; all celebrated in this class of composition.

A'NTHEMIS is the genus of plants to which the useful herb chamomile belongs. It is of the compound flowered order, and is distinguished by having the scales that surround its flower-heads membranous at the border.

Anthemis nobilis, or chamomile, is frequent in a wild state on many of the commons near London, where it adds a peculiar richness of colour and fragrance to the turf. It is a very dwarf plant, with finely-cut leaves; its flower-heads are white in the ray, but deep yellow in the disk; all the parts are intensely bitter, but especially the little yellow flowers of the disk; for this reason the wild blossoms are far more efficacious than those of the cultivated sort, in which there is scarcely any disk; the flowers of the ray having almost entirely usurped their place.

There is another wild plant, called *Anthemis cotula*, or mayweed, which must not be confounded with chamomile, to which it bears great resemblance: it may be distinguished by its being an erect branching plant, with an exceedingly disagreeable and powerful odour.

Anthemis tinctoria is used in France by the dyers for the sake of a brilliant yellow tint, which is obtained from it.

Medical Properties of Anthemis Nobilis.—Chamomile is an excellent bitter and tonic agent. Given in powder, or pill, or extract, with addition of a few drops of the oil, it is of great service in dyspepsia, atonic gout, and in intermittent fevers. The infusion may be made the vehicle for alkalies, or acids. The infusion when tepid is emetic, and may be given beneficially in dyspepsia, and at the commencement of catarrh (particularly influenza), and hooping-cough. The decoction is an objectionable form, as it dissipates the oil. Even the infusion should be made with cold water. The infusion of chamomile, either warm or cold, furnishes an excellent application to weak eyes, or after exposure to the wind in travelling, especially by railroads. This used early will often ward off inflammation.

Medical Properties of Anthemis (or *Ancyclus*) *Pyrethrum.*—Pellitory of Spain grows in the south of Europe, north of Africa, and in Syria, but the root of another variety, *Pyrethrum*, Willd., native of Germany, is also met with. The first is called the Roman or true Pellitory, the latter the German: this is necessary to be known, as the chemical analysis varies considerably. The root is the part that is used. Roman Pellitory contains (in 100 parts)—acrid fixed oil (resin), 5; volatile oil, a trace; yellow extractive, 14; gum, 11; inulin, 33; muriate of lime, a trace; woody matter, 35; loss, 2.

Its use is confined to local affections of the mouth, whether sub-inflammatory or paralytic. In rigidity of the muscles of the jaw, or rheumatic pains, from exposure to currents of air, chewing this is often of great service. An infusion may also be held in the mouth in toothache from cold. A tincture may be formed of it, which would be a useful agent in paralysis of the stomach, added to the infusion.

ANTHE'MIUS, a mathematician and architect of the sixth century, was the most distinguished of the architects employed by Justinian at Constantinople; he began to rebuild the church of St. Sophia after it was destroyed by the populace in 531, and it was completed after his designs by Isidorus of Miletus, after the death of Anthemius, which seems to have taken place in the year 534. The church was not finished until 537. The dome fell in twenty years afterwards, through the shock of an earthquake; it was, however, again rebuilt by Isidorus, and the dome then raised was the first that was ever built upon arches and piers, and still remains; it is built of stone, and is 108 feet in diameter.

ANTHER. The part thus named in plants is the upper half of the stamen, or fertilizing organ, of a flower; it is the case which contains the pollen, in which the principle of fertilization is inclosed. An anther generally consists of two hollow lobes, lying side by side, and united by a fleshy body, which is sometimes of great size, but more usually extremely small, and called the connective. Their position is, for the most part, such that, when they open, the line by which they burst is next the stigma, so that the pollen they emit may fall upon that organ; but to this there are many exceptions, and we sometimes find the anther so placed, that it is impossible to explain the manner in which its pollen can reach the stigma, without supposing the pollen to be conveyed by insects.

The dehiscence, or act of bursting, of the anther, should take place at the exact time when the stigma is ready to receive the influence of the pollen, and this is insured by the following beautiful contrivance of nature. At the time when the flower is closed, all the parts contain much more watery matter than after its bursting; this superfluity of water is got rid of by the pistillum absorbing it like a sponge from the surrounding parts; by degrees the anther among the rest becomes dry, and as soon as that happens an immense number of tiny springs which line the anther, having no appreciable individual force, but a considerable power when combined, begin to contract sideways, and at last pull asunder the two sides of each lobe, which give way at the line of dehiscence above referred to, and the pollen falls out, or is ejected, according to the degree of rapidity with which the springs contract. It is scarcely possible to find in all the animated world a more striking proof of the perfect design with which every part of organic matter is fitted for the fulfilment of the end of its creation. [POLLEN; SEXES OF PLANTS; STAMENS.]

ANTHIA'NUS, FU'RIUS, a Roman, from whose work on the Edict, 'Ad Edictum,' there are three excerpts in the Digest. [JUSTINIAN'S LEGISLATION.] The age in which Anthianus lived is unknown.

ANTHOLITHES (Brongniart). Some fossil plants thus designated occur in the coal formations of Shropshire and Northumberland.

ANTHO'LOGY, a compound Greek word, used metaphorically, which signifies *a Garland of Flowers:* it consists of short poems on amatory, convivial, moral, funereal, monumental, descriptive, dedicatory, satirical, and humorous subjects. Their characteristic merit consists in the just expression of a single thought with brevity and poetic beauty. The term *anthology* is peculiarly appropriated to a collection of Greek Epigrams; but the word epigram is not here used in the confined sense of a pointed and witty conceit, but in the more enlarged and literal acceptation of an *inscription*. The earliest and closest application of the term epigram was to certain short sentences inscribed on offerings in the temples, on buildings, and statues. The largest portion of those collected in the Greek Anthology were written in honour of the dead; or as tributes to beauty, in gratitude for acceptance, or in complaint on account of rejection; some of them are panegyrics on living and illustrious virtue; others contain brief records of remarkable events; others again consist of observations on human life, for the most part in a dark style of colouring.

Meleager the Syrian, whose exact date seems difficult to fix, lived probably somewhat less than a century before the Christian æra, and is generally understood to have first collected the scattered fragments of the Grecian inscriptive muse.

Philip of Thessalonica continued the work about the time of Tiberius. The additional compositions were less interesting, but still pleasing. In the sixth century, Agathias collected the miscellaneous fragments of his time, and added his own contributions to the expiring muses of Greece. He had a coadjutor in his friend Paul the Silentiary, an officer in the court of Justinian, whose topics were desultory, and his style that of the courtier and the voluptuary. The present collection, although large, retains more pieces from the compilation of Agathias than from that of his two predecessors conjointly.

The first printed edition of the *Anthologia* was that of Lascaris, Florence, 1494. The edition of Jacobs (13 vols. 8vo., Leipzig, 1794—1814) is the latest and most complete, but it contains matter which does not properly belong to an anthology. There is much matter strictly applicable to this purpose still inedited.

A volume of translations, chiefly from the Greek *Anthology*, was published in 1806 by Messrs. Bland and Merivale, with contributions from other gentlemen, and it has twice been republished. The last edition of 1833 is much improved.

ANTHONY, SAINT, the first institutor of the monastic life, was born at a village in Upper Egypt, in the year 251. His parents, who were wealthy, are said to have prevented him, when young, from acquiring any other language than his native Coptic. Having understood some passages of our Saviour's precepts in their literal sense, he distributed the property which came to him by inheritance, at an early age, partly among his neighbours, and partly among the poor, and, having placed a sister who was committed to his charge in a house of virgins, retired to a solitude in the neighbourhood of his native village. He is said to have erected his first monastery at Phaium, near Aphroditópolis, about the year 305.

Till his death, in 356, he lived a life of seclusion and mortification; and the ancient legends constantly represent him as struggling against the assaults of the devil.

Seven of St. Anthony's letters, written originally in Coptic, but translated into Latin, are extant in the *Bibliotheca Patrum*.

Among the miracles believed to have been wrought by his intercession, was the cure of the distemper called the sacred fire, since that time called St. Anthony's fire, and in modern days erysipelas.

ANTHONY, ST., FALLS OF. [MISSISSIPPI.]

ANTHONY'S FIRE, ST. [ERYSIPELAS.]

ANTHOPHYLLITE occurs in crystalline masses with a fibrous columnar structure; it has a brownish yellow colour, a translucent texture, and a pearly lustre. It consists of—Silica, 56; protoxide of iron, 13; magnesia, 23; protoxide of manganese, 4; lime, 2; alumina, 3.

ANTHOPHYLLUM (Schweigger), a fossil genus of MADREPHYLLIÆA.

ANTHOSPE'RMEÆ (from *ἄνθος*, flower, and *σπέρμα*, seed), a tribe of plants resembling *Anthospermum* (the Amber-tree), belonging to the natural order Cinchonaceæ. It consists of the genera *Coprosma, Phyllis, Galopina, Ambraria*, and *Anthospermum*. None of the species are used in the arts or medicine; the tribe is, however, interesting as forming a link between the opposite-leaved Cinchonaceæ and the verticillate Rubiaceæ. The genus Phyllis has but a single species, known by the common name of Bastard Hare's-ear. It may be cultivated, with other species of the tribe, in a mixture of loam, peat, and sand.

ANTHOXANTHUM, a genus of grasses, one species of which (*A. odoratum*) is well known to farmers under the name of the *sweet vernal grass*. It is a small annual plant, bearing its flowers in

Anthoxanthum odoratum. *a*, a flower-head magnified.

short heads, which are not very compact, and broader at the bottom than the top. The flowerets

of which it is composed are a pale yellowish green; each consists of two sharp-pointed smooth glumes, within which are two other dark-brown hairy paleæ, each having an awn at its back; the stamens are only two in number. This grass is of little importance for its nutritive qualities, but it is much esteemed for the sweet smell of its leaves, which causes much of the well-known fragrance of new-mown hay.

ANTHRACITE, a black, light, mineral substance, resembling coal. It is also called *blind coal*, and *glance coal*. Its specific gravity is about 1·400; it is slowly combustible, but without flame; and it contains 96 per cent. of pure carbon: it is, in fact, a mineral charcoal. Naphtha may be considered as one extremity of the mineral carbonaceous substances, and anthracite as the other. Tar, petroleum, bitumen, asphaltum, and the various kinds of coal, form the intermediate members of the series. Anthracite is now much used as a steam-engine fuel. Small quantities of Anthracite are found in the primary strata of most countries, as, for instance, in the old slate of Cornwall, Devon, and Cumberland, where the appearances led to borings and other works in search of coal. In the South of Ireland anthracite occurs in clay-slate and grauwacke, so thick as to be regularly worked for the purpose of burning the lime of the district; the most considerable collieries have yielded 25,000 tons annually; and all the coal of the province of Munster, with the exception of that of the county of Clare, is of the same sort. It is found in many of our coal-mines, but generally in those situations where the coal comes in contact with clay-slate.

ANTHRACOTHE'RIUM (Cuvier), a fossil genus of pachyderm? mammals, of which many species occur in tertiary deposits, especially in the gypseous and lignitic strata of Paris and Tuscany.

ANTHROPO'LOGY, derived from the Greek, implies the science or theory of man. It has been little cultivated among us as a separate study; but in Germany various professors have read lectures on it, and subsequently published their treatises. Of these, the most distinguished is that of Kant, the last, and from its nature, as divested of abstruse speculation, the most popular of his works. It was published by him about the year 1798, from his text-book. He had been for thirty years accustomed to give a winter course of lectures on this subject, and another during the summer on physical geography, to a mixed audience, as a relief from his more severe duties as professor of pure philosophy. His observations supply the best notion of that which ought to constitute such a science, and the uses to be drawn from it, when properly executed.

A theory of the science of man, systematically executed, may either be directed to explain the phenomena and principles of our corporeal nature —and in that case it would be properly called *physiological anthropology*; or it might be calculated to furnish instruction for the cultivation and improvement of our intellectual and moral powers, and the knowledge of man, both as an individual and a species, in which case it might be termed *pragmatical anthropology*. The former, it is evident, turns on the investigation of what nature makes of man—the latter on what man, as a free agent, either makes, or can or ought to make, of himself. If the cause of memory in man is assumed to be impressions left behind in the brain, he must be content to remain a mere spectator of Nature's mechanism, and can turn his observations to no account: whereas, if he applies his experience of what has been found useful or prejudicial to memory, in order to acquire greater power or facility in its exercise, the knowledge thus obtained, being formed into a system, would constitute that branch of anthropology which we have called pragmatical, and which it would be useful for him to cultivate.

Such an anthropology, considered as knowledge of the world, is subsequent in its cultivation to the period of academical studies; it considers man as a citizen of the world, and has nothing properly to do with the natural varieties of the human race: neither does it invade the secluded circle of what is called the great world, the individuals of which are too near to each other, and too remote from the rest of their species, to be observed with advantage. Among the best means for cultivating it, after laying in a proper store of that general information which takes precedence of all local and partial knowledge, is travel, and the reading of travels—to which may be added as aids, if not direct sources of anthropology, history, biography, the drama, and even novels and romances.

The chief obstacles to its acquirement, and attaining the rank of a science, are,—in others, the unwillingness to be observed; in ourselves, the counter check, that while we are under any emotion, we cease to observe, and when we observe, the emotion ceases; and lastly, the force of habit, which perplexes our judgment, both as to what by nature we ourselves are, and what our neighbour is. The nature of an outline of a systematic anthropology will be understood from the contents of Kant's work (*Anthropologie in Pragmatischer Hinsicht*. Fourth edition. By J. F. Herbart. Leipzig, 1833).

ANTHROPO'PHAGI. [CANNIBALS.]

ANTHROPOMORPHISM, a compound Greek word, literally signifying "the representation of human form;" but it is used to signify the 'representation of divinity under a human form;' and the nations or sects who have followed this practice have been sometimes called Anthropomorphites. The Egyptians represented deities under human forms, as well as those of animals, and sometimes under a combination of the two. The ancient Persians, as Herodotus tells us (i. 131), adored the Supreme Being under no visible form of their own creation, but they worshipped on the tops of mountains, and sacrificed to the sun and moon, to earth, fire, water, and the winds. The Hebrews were forbidden (Exodus xx. 4, 5) to make any image or the representation of any animated being whatever.

The popular opinion of the Greeks never separated the idea of superior powers from the representation of them under a human form: hence, in their mythology and in their arts, each deity had his distinguishing attributes, and a character-

istic human shape. Painters in modern times have represented the Supreme Power, and our Bibles have sometimes been illustrated, with engravings of this character.

Anthropomorphists is also the name of a sect of early Christians.

ANTHUS (Bechstein), a genus of birds, termed Pipits, now separated from the Linnæan genus *alauda* (lark), with which it was formerly associated. In their general form and manners the pipits closely resemble the wagtails (*Motacilla*); but in style of colouring, and in the elongation of the hinder claw, they resemble the larks. [PIPIT.]

ANTIARIN, the poisonous principle of the *Upas Antiar*. It forms small pearl-like crystals, soluble in boiling water and alcohol. It consists of 14 equivalents of carbon=84; 10 of hydrogen=10; 5 of oxygen=40: making the equivalent of antiarin=134.

ANTIA'RIS is the botanical name of the half-fabulous upas-tree, of which so many idle stories were propagated some years since by travellers. It was said to be a large tree, growing in the island of Java, in the midst of a desert caused by its own pestiferous qualities; its exhalations were reported to be so unwholesome, that not only did they cause death to all animals which approached the tree, but even destroyed vegetation for a considerable distance round it; and, finally, the juice which flowed from its stem, when wounded, was said to be the most deadly of poisons. To approach the upas-tree, even for the momentary purpose of wounding its stem and carrying away the juice, was stated to be so dangerous, that none but criminals under sentence of death could be found to undertake the task. As is usual in such cases, this fable is founded upon certain natural phenomena which occur in Java. There is such a tree as the upas, and its juice, if mixed with the blood in the body of any animal, is speedily fatal; and there is also a tract of land in the same island on which neither animal nor plant can exist. But the two circumstances have no relation to each other: the poisoned tract is a small valley completely surrounded by a steep embankment, like the crater of a volcano, and is continually emitting from its surface carbonic acid gas, which is alike fatal to animals and plants; on the other hand, the poisonous upas-tree is not an inhabitant of the valley, for nothing can live there, but it flourishes in the woods, in the midst of other trees which are unharmed by its vicinity.

ANTIBES. [VAR.]

ANTICHRIST (Ἀντίχριστος) means, literally, the opponent of the anointed, or of the Messiah. The name of Antichrist was given by Jews and Christians to the great enemy of true religion, who shall, according to the Holy Scriptures, appear before the coming of the Messiah in glory.

ANTICLI'NAL, a term in geology which expresses the fact that, from a given line, the strata dip in opposite directions.

ANTICOSTI, an island lying in the mouth of the river St. Lawrence, in North America. It does not possess a single harbour. The shore on the north side is high, and the water close to the cliff is deep; on the south the land is low, and the water shoal. The island is uninhabited, with the exception of two families who have been established there by the governor of Newfoundland, for the purpose of giving help to persons cast away upon the coast. The surface is swampy, and in most parts covered with stunted trees and underwood. Bears, foxes, and sables, are numerous, and all sorts of game are abundant.

ANTIDICOMARIANITES (from the two Greek words ἀντίδικος, *adversary*, and Μαρία, *Mary*), a sect whose peculiar belief was that Mary the mother of our Saviour did not continue a virgin after his birth, as the Roman Catholic Church asserts that she did to the end of her life, but bore other children to her husband Joseph.

ANTIDOTES, from two Greek words, ἀντί, 'against,' δοτὸς, 'given;' the means of counteracting the effects of poisons.

The selection of appropriate means to counteract the effects of poisons must be determined by a knowledge of the manner in which each particular poison acts; but, as we cannot enumerate or specify these here, we shall give only general rules to this effect. These may be reduced to three, viz., 1, to remove the poisonous substance: 2, to prevent or limit its local effects: 3, to obviate its effects on remote organs, supporting their action by appropriate measures, till the injurious impression has subsided. The first of these is to be accomplished mostly by mechanical means. If the poison has been applied to any external part, as by the bite of a viper or rattle-snake, a cupping-glass, or what will answer as well, a wine-glass, tumbler, or cup of any kind, from which a part of the air has been expelled, by holding within it a lighted candle for a second of time, should be immediately applied. If the poison has been taken into the stomach, and is not of a kind to arrest instantly the action of the heart, its removal is to be attempted by the stomach-pump, or by exciting vomiting. The stomach-pump cannot well be used without introducing into the stomach a considerable quantity of water, which, by diluting the poison, lessens its violence, in all cases, except that of oxalic acid. The stomach-pump is also to be preferred in the case of narcotic poisons, as the insensibility which they occasion prevents the stomach from being affected by emetics. But should a stomach-pump not be at hand, nor any one be present skilled in the use of it, we must attempt to produce vomiting by every means in our power. For this purpose, a table-spoonful of flour of mustard, which is mostly to be found in every house, may be put into a tumbler of warm water, and given to the patient; or a scruple of sulphate of zinc (white vitriol) dissolved in a pint of distilled water; or ten grains of sulphate of copper dissolved in half a pint of any distilled water, as cinnamon, may be drunk by the patient, and the disposition to vomit encouraged by tickling the throat with a feather, and pressing on the pit of the stomach. Neither ipecacuanha nor tartar emetic should be given, as their action is always preceded by much nausea, during which the absorption of the poison is often facilitated.

Where the poison is of a corrosive or irritant nature, instead of losing time in seeking the means of causing vomiting, it is in general advisable to

adopt the second rule, and attempt to prevent or limit its local, and thereby its remote effects. To accomplish this, we must ascertain what the poisonous substance was from which the patient is suffering, and must also know how it acts, as upon this depends the success of our treatment. The objects we must have in view are either to dilute, and so weaken it; to supply from an external source the particular principle which the poison would abstract from the coats of the stomach; or, by adding something to it, so change its nature as to render it comparatively or altogether harmless, which last will always be effected if we can succeed in forming an insoluble compound. The first may be done by giving plenty of warm water; and when we know the particular poison, if the warm water can be made the vehicle of an antidote, the second or third object will also be ensured. Suppose sulphuric acid (oil of vitriol) has been swallowed, add to the water chalk, magnesia, or soap: the chalk will make, with the acid, sulphate of lime, which, being insoluble, will do no harm, while, with the magnesia, the acid will form sulphate of magnesia (Epsom salts), and with the soap sulphate of potash, both of which are purgative salts, and will, by their action on the bowels, assist in lessening the inflammation caused by the poison before it was decomposed. So, when sugar of lead (acetate of lead) is swallowed, by giving Epsom salts we form an insoluble sulphate of lead, which will be discharged by the bowels, operated upon by the magnesia, which has been freed from the sulphuric acid. Corrosive sublimate (bi-chloride) of mercury abstracts from the coats of the stomach the albumen which they contain, by which it is converted into protochloride, or calomel; now, if by giving white of egg, which is pure albumen, we supply it with the principle which it would otherwise obtain from the coats of the stomach, we shall preserve these entire. [POISONS.]

ANTI'GONUS, one of the officers of Alexander the Great, a Macedonian by birth. From the time of Alexander's death, B.C. 323, till his own death, B.C. 301, the history of Antigonus is in great measure the political history of western Asia.

In the general distribution of provinces, after Alexander's death, to the chief Macedonian officers, Antigonus received the Greater Phrygia, Lycia, and Pamphylia. As soon as Perdiccas conceived the project of rendering himself the master of all the Macedonian conquests, Antigonus saw his danger, and fled with his young son, Demetrius, to Antipater. Antipater, on making a fresh distribution of the Asiatic provinces, added Susiana to Phrygia and Lycia, which Antigonus held (there is no mention of Pamphylia in the second division), and declared him general of the king's forces in Asia, with a commission to prosecute the war against Eumenes, satrap of Paphlagonia and Cappadocia, who had espoused the party of Perdiccas. Antigonus gained a victory over him by bribing one of his chief officers to desert in the hour of battle, and Eumenes shut himself up in the strong fortress of Nora, which was not taken till after the death of Antipater, and sometime in B.C. 318. Perdiccas had died B.C. 321.

On the death of Antipater, Antigonus began to attempt the establishment of an independent kingdom in Asia. He was a man of great talents, and had the possession of four provinces and a powerful army of 60,000 foot, 10,000 horse, and 30 elephants. He attempted to gain over Eumenes, by sending the most flattering invitations to that general, who was still in Nora; and Eumenes agreed to take an oath of fidelity to him, conjointly with Olympias and the children of Alexander. Meanwhile, he expelled the satraps of Lydia and Hellespontine Phrygia, or Mysia, from their provinces, and took possession of Ephesus.

Cassander, son of Antipater, dissatisfied with the inferior station assigned to him by his father, sought, by the assistance of Antigonus, to supplant Polysperchon, and obtain the protectorate of Alexander the son of Roxana, who was now king of Macedonia. Antigonus readily promised this; but he found a formidable enemy in Eumenes, who was no sooner at large than he collected a powerful force, and receiving from Olympias, the grandmother of the young Alexander, a large sum of money, he declared himself in support of the authority of Alexander; but, unable to make head against Antigonus, he retreated through Cilicia and Cœle-Syria into Babylonia, where he wintered in 317-6.

After a doubtful summer campaign, closed by an indecisive battle, the armies separated, Antigonus taking up his winter quarters in Media, Eumenes in Gabiene. A district of nine days' journey separated the two armies. Antigonus made an attempt to surprise Eumenes, and a battle ensued, in which Eumenes was defeated and fell into the hands of Antigonus (B.C. 315), and was shortly after put to death. Thus the royal crown lost its best and most faithful supporter.

Antigonus went into winter quarters near Ecbátana. On quitting Media, he directed his march towards Susa, the citadel of which, containing large treasures stored there by Alexander, was delivered up to him by order of Seleucus. Returning towards the Mediterranean through Babylonia, he quarrelled with Seleucus, of whom he required an account of the revenues of his province. The Babylonian satrap declined to render it; but, finding that his dangerous ally would by no means admit this answer, Seleucus fled to Egypt, and sought to engage Ptolemæus in combination against Antigonus, who now aimed at uniting all the Macedonian conquests under himself.

Cassander, and Lysimachus, governor of Thrace, joined with Ptolemæus and Seleucus, and required Antigonus to resign Cappadocia and Lycia to Cassander, Hellespontine Phrygia to Lysimachus, Syria to Ptolemæus, and Babylonia to Seleucus. Antigonus replied by menaces against Ptolemæus. He sent ambassadors to gain Rhodes and Cyprus to his party, and cultivate the friendship of Polysperchon, who now became united to him by their common jealousy of Cassander. Antigonus also built ships in Phœnicia. It is said by Diodorus that 8000 men were employed in felling and sawing timber. In the summer the Rhodian

fleet in his service had been defeated by the lieutenant of Ptolemæus on the coast of Cilicia; but he had got possession of the strong cities of Joppa, Gaza, and Tyre. He left his son Demetrius, surnamed Poliorcétes, or Taker of Cities, to command in Syria, and himself repaired to the western coast of Asia, in the winter of 314–3. During the next year, the greater part of Caria fell into his hands, and in the following year most of Peloponnesus, Eubœa, Thebes, and the greater part of Phocis and Locris, were gained to his alliance. But Demetrius was defeated by Ptolemæus in a great battle at Gaza, and Antigonus lost the coast of Syria, as far as Sidon (B.C. 312, after midsummer). Seleucus, encouraged by this success of his ally, returned to Babylonia with only 2000 followers, and regained possession of his satrapy. From this time the æra of the Seleucidæ commences. Antigonus now returned to Syria, and Ptolemæus, unwilling to risk a battle, retreated to Egypt. Antigonus then employed his son in a fruitless attempt to take Petra, the chief city of the Nabathæan Arabs. Demetrius failed in this project, and also in an attempt to expel Seleucus from Babylonia, B.C. 311. A peace was concluded between Cassander, Lysimachus, and Ptolemæus, on the one part, and Antigonus on the other, upon condition that Cassander should be president of Europe until Alexander, son of Alexander the Great by Roxana, attained his majority; and that the other parties should remain in possession of what they each had; and that the Grecian cities should be free.

We may here briefly trace the history of the royal family of Macedon up to this time. After Antipater's death, Polysperchon brought forward Alexander, son of Roxana, supported by Olympias, as a rival to Arrhidæus. Arrhidæus fell into the hands of Olympias, who put him to death, B.C. 317. In the following year, Olympias being taken prisoner, with Roxana and her son, suffered the same fate at the hands of Cassander, who retained the young king and his mother in custody. On the conclusion of this peace, he murdered the mother and the son, partly because his own government was to cease when the youth came of age. Two only of the descendants of Philip now remained. Hercules, the son of Alexander by Barsine, was brought forward by Polysperchon as a claimant to the crown; but his treacherous guardian was bribed to murder him by Cassander (B.C. 309). Somewhat later, Cleopatra, Alexander's sister, having engaged herself in marriage to Ptolemæus, was secretly poisoned by Antigonus. Thus was the house of Philip and Alexander cut off, root and branch.

The peace did not last more than a year, and Ptolemæus was the first openly to break it. During the years 310, 309, 308, B.C., hostilities continued. In June 307, Demetrius, being sent to Greece by his father with a powerful fleet to set free the Grecian cities which were still held by Cassander, was received as a friend by the Athenians, and he restored the democracy. Demetrius also took Mégara, which was held by Cassander; but he was hastily recalled to Asia, to oppose Ptolemæus. He gained Cyprus to his father's cause, and defeated Ptolemæus, who came with a great fleet to relieve the island, B.C. 306. On hearing of this success, Antigonus assumed the diadem, the ensign of regal dignity in Persia, with the title of king, and his example was followed by Ptolemæus, Lysimachus, Seleucus, and Cassander.

In B.C. 305, Antigonus invaded Egypt both by land and sea, but he was obliged to return to Syria, with some loss and no glory. In 304 he turned against Rhodes, which resisted bravely, and though pressed by Demetrius held out for a year; at the end of which Antigonus required his son to make peace on the best terms he could with the besieged, and repair to Greece, where Cassander, during his absence, had regained much power. Demetrius drove Cassander beyond Thermópylæ (B. C. 303), and assembled a general council at the Isthmus, at which he was chosen captain-general of Greece. Cassander now endeavoured to conclude peace with Antigonus; but, failing in this, he engaged Lysimachus, Ptolemæus, and Seleucus, to make a diversion by invading Asia Minor. This was done by Lysimachus, B.C. 302, but no battle took place in that year. In the spring, Antigonus recalled Demetrius from Greece, and in August 301 the armies met at Ipsus, in Phrygia. Antigonus had about 70,000 foot, 10,000 horse, and 75 elephants. The allied kings mustered 64,000 foot, 10,500 horse, with 400 elephants, and 120 armed chariots. The battle was lost, owing in part to the impetuosity of Demetrius. Antigonus fought bravely to the last, but he fell in the battle, his army was routed, and Demetrius fled into Greece.

Thus perished Antigonus, at the age of 81, leaving the character of a brave, able, and successful soldier, a faithless, merciless, insatiable, and insolent man. His extensive empire was divided among the victors [SELEUCUS], and his son, after experiencing many revolutions of fortune, died in captivity.

ANTI'GONUS GONA'TAS, so named from being born at Goni, or Gonnos (Strab. p. 440), in Thessaly, son of Demetrius Poliorcétes. After the death of his father, the Macedonian throne was seized by Ptolemæus Ceraunus (B.C. 281). Ceraunus was slain in battle against the Gauls. After the great overthrow of the barbarians in Thessaly, Antigonus defeated another division of them in Macedonia, and soon after gained possession of Macedonia, B.C. 277. After many reverses, he held his own dominions in peace during the latter part of his life; but he was continually employed in extending his influence in Peloponnesus, and was brought into frequent collision with the Achæan league. [ARATUS.] He died B.C. 243, or 239 (Clinton), leaving a son, Demetrius II., who reigned ten years.

ANTI'GONUS DOSON ('about to give'), so named, because his promises were more ready than his performance, is said to have been the son of a Demetrius who was the son of Demetrius Poliorcétes, and of course the brother of Antigonus Gonatas. Being appointed guardian to Philip, the infant son of Demetrius II., he was called to or usurped the throne, B.C. 229: but he

acted the part of a kind of protector to Philip, who succeeded him. He enlarged the limits of the Macedonian monarchy, and took an important share in the affairs of Greece, for the most part in concert with Aratus and the Achæan league. [ARATUS; CLEOMENES.] He died B.C. 221. (Feb. 220, Clinton.)

ANTI'GONUS CARY'STIUS, probably a native of Carystus in Eubœa, is the reputed author of a work, intitled a 'Collection of Wonderful Histories.' Antigonus is generally supposed to have lived in the age of Ptolemy II. of Egypt. This collection, which on the whole is of very little value, was last edited by J. Beckmann, Leipzig, 4to., with a commentary.

ANTIGUA, one of the West India Islands, and a British colony. The town of St. John, the capital of the island, is in 17° 10′ N. lat., and 61° 57′ W. long. Antigua is about twenty-one miles long, and is nearly of the same breadth. It contains much level land, and is not in any part mountainous. The shore is in general rocky, and surrounded by dangerous reefs, which make it difficult to approach, but there are several excellent harbours; in one of which—English Harbour, situated on the south side of the island—is a dockyard belonging to government, with every convenience for carecning and repairing vessels. The island does not contain a single river, and the few inconsiderable springs which it has are so brackish, that the inhabitants are forced to collect rain-water, and preserve it in cisterns for domestic use.

The island is now divided into six parishes, each of which has a town or village, and eleven districts. The town of St. John, on the north-west side of the island, is built at the bottom of the bay of the same name, which is defended by a fort, and forms an excellent harbour. The town is on the side of a hill, and its streets are in some parts very steep. Willoughby Bay, on the south-east side, has its entrance much contracted by a reef, but is secure within, and affords good anchorage in four to five fathoms water. On the north side of the island is the small town of Parham, built on the south side of a spacious harbour. A little island, called Prickly Pear, lies off the west point of the entrance to Parham Harbour. Falmouth Harbour is to the westward of English Harbour, already mentioned; and the town of Falmouth is built on the western side of this harbour. Five Islands Harbour lies on the western side of the island.

Antigua was discovered by Columbus in 1493, and was colonized by settlers from England in 1632. Since then, its chief produce has been sugar. The cultivation of cotton, once carried on in the island, is now discontinued. In 1840 the population was about 37,000. In 1841 the exports from the island were valued at 295,343*l.*, of which sugar and molasses alone amounted to 289,627*l.* On Feb. 8, 1843, the island was visited by an earthquake, which destroyed more than half of the churches, principal buildings, and sugar mills. The administration is conducted by a governor, a council nominated by the crown, and a house of assembly chosen by the colonists. The governor's jurisdiction extends also over a few small neighbouring islands.

ANTILIBANUS. [LIBANUS.]

ANTILITHICS. [LITHONTHRYPTICS.]

ANTILLES, the name given to the great group of islands in the Atlantic Ocean, which lie between the continents of North and South America. They are generally treated of as two groups—the Greater Antilles, including Cuba, Puerto Rico, which belong to Spain, and Jamaica, which belongs to England; and the Lesser Antilles, comprehending Antigua, Barbadoes, Dominica, Grenada, St. Kitt's, Ste. Lucie, St. Vincent, Tobago, Trinidad, Anguilla, Barbuda, Montserrat, Nevis, which belong to England: Margarita, Testigos, Tortuga, Blanquilla, Orchulla, Rocca, Aves, which belong to Spain: Guadaloupe, Martinique, Marie Galante, Desceada, St. Martin (north part), which belong to France: Buen Ayre, Curaçoa, Aruba, St. Martin (south part), Saba, St. Eustatius, which belong to Holland: St. Bartholomew, which belongs to Sweden: and the VIRGIN ISLANDS, the largest of which are—Anegada, Virgin Gorda, Comance, Beef Island, Guana, and Tortola, which belong to England; and St. John, St. Thomas, and Santa Cruz, which belong to Denmark. Antilles is but another name for the WEST INDIES, and the islands seem to have got this name from their position 'before' or in front of the American continent.

ANTILOGARITHM, as used in this country, means the *number to the logarithm*. Thus, in Briggs's system, 100 is the antilogarithm of 2, because 2 is the logarithm of 100.

A'NTI-MI'LO is a small island opposite the north-western part of the island of Milo, the ancient Melos, in the Grecian Archipelago. [MILO.]

ANTIMONY, a metal sometimes called *regulus of antimony*, occurs, though rarely, native, and is generally procured from the sulphuret, which is the only abundant ore of the metal. When this is heated in contact with iron, the sulphur, on account of its greater affinity for that metal, is separated by it from the antimony, which is consequently reduced to a nearly pure metallic state. Its colour is silver white, lustre considerable, and the fracture fine laminated when pure; but the antimony of commerce is broad laminated. Its specific gravity is about 6·7, and atomic weight 64. When slowly cooled after fusion, it crystallizes in the octahedron or its varieties. When it is exposed to the air, this metal tarnishes, and at a red heat it melts.

Oxygen and Antimony may be combined in several modes and in different proportions. There are many ways of producing the *sesquioxide of antimony*, the composition of which is—antimony 2, oxygen 3. This oxide is a dingy white powder, insoluble in water, but it is dissolved by dilute nitric acid, and by strong nitric acid is converted into antimonious acid. Muriatic acid also readily takes it up; the same effect is produced by bitartrate of potash, and the solution on cooling deposits octahedral crystals, which have been long known and employed in medicine under the name of *tartar emetic*, or *tartarized antimony*. It is soluble also in potash, soda, and ammonia. A second compound is the *deutoxide*, or *antimonious acid*, contain-

ing antimony 1, oxygen 2. This acid is neither fusible nor volatile at a red heat. Its saline compounds are termed *antimonites*, as antimonite of potash, &c. If it be fused with this alkali, the salt formed dissolves in water, from which the acids throw down a white precipitate of antimonious acid combined with water. A third compound of oxygen and antimony is the *peroxide*, or *antimonic acid*. It is a pale yellow powder, consisting of antimony 2, oxygen 5. Its action on the animal economy is but slight. Antimonic acid is tasteless and insoluble in water; it does not decompose the alkaline carbonates in the moist way, but when heated with them it combines with the alkali and expels the carbonic acid.

Neither nitrogen, hydrogen, nor carbon combine with antimony.

Chlorine and Antimony unite to form two compounds. The *protochloride*, or *sesquichloride*, sometimes called *butter of antimony*, is composed of chlorine 3, antimony 2. It is a soft and nearly colourless solid. At a moderate heat it liquefies, and it absorbs moisture from the air. From it is prepared the submuriate of antimony, formerly employed in medicine under the name of *pulvis Algarotti*. The other compound is a *perchloride of antimony*, consisting of chlorine 5, antimony 2. It is a colourless or slightly yellow fluid, has a strong disagreeable smell, and emits white fumes. It attracts moisture from the air, and when mixed with water it is decomposed, and converted into muriatic acid and antimonic acid.

Bromine and Antimony form *bromide of antimony*. At common temperatures it is solid, colourless, crystallizes in needles, attracts moisture from the air, and is decomposed by water. It melts at about 206° Fahrenheit, and boils at 518°. *Iodine* also combines with antimony to form an iodide. But neither this nor the bromide is applied to any use.

Sulphur and Antimony combine to form several compounds. The chief of these is the *sesquisulphuret*, or *crude antimony*, which is the principal ore of the metal. It is found in many parts of the earth; it is of a lead grey colour, possessing considerable splendour, and is met with compact, in acicular crystals, and in rhombic prisms. It is composed of sulphur 3 atoms, antimony 2 atoms. It is much employed in preparing metallic antimony, glass of antimony, crocus of antimony, James's powder, and some preparations in the London and other pharmacopœias. It is soluble in a hot solution of potash or soda; on cooling, an orange-red substance is deposited, called *kermes-mineral*; this was formerly much used in medicine. When an acid is added to the remaining cold solution, a further portion of a similar precipitate is formed: this is sometimes called the *golden sulphuret of antimony*, and in the 'London Pharmacopœia,' *sulphuretum antimonii præcipitatum*.

The only salt of antimony, strictly speaking, of any great importance, is the double tartrate of potash and antimony, usually termed tartar emetic, or tartarized antimony—the *antimonium tartarizatum* of the 'London Pharmacopœia.' Of all the preparations of antimony this is the most valuable. The Pharmacopœias also contain a preparation in imitation of James's powder, called *pulvis antimonialis*.

Antimony is susceptible of combining with all metals. It makes them very brittle. The principal alloys of antimony are that with lead, employed as *type metal*, and the alloy of antimony and tin, used for plates on which music is engraved.

Medical Properties.—As antimony cannot produce any effect on the human system, unless when so prepared as to be capable of decomposition by the fluids of the body, the tartarized form, being the most soluble, has properly superseded the others. Its action varies according to the dose, the mode of administration, and the state of the system when it is exhibited. In very small doses, it seems to increase the activity of the function of secretion, particularly of the mucous membranes; hence it occasions a flow of thin fluid from these surfaces, which form the inner lining of the lungs and intestinal canal, and also an increased action of the skin and flow of perspiration, if the patient be kept warm. In a larger dose it causes vomiting, with all the phenomena of that action; and, from being commonly employed for this purpose, it is designated *Emetic Tartar*. It is used as an emetic, but should not be given in cases of poisoning. It is also employed in fevers and inflammatory diseases, on account of its sedative action on the heart. It is also in daily use for the cure of catarrhal affections, *i. e.* colds affecting the mucous membrane of the lungs.

ANTINO'MIANS, from the Greek, signifies *against the law*. It is applied by theologians to those, if any there be, who hold that faith in Jesus Christ dispenses with, and renders unnecessary, so far as a future state is concerned, the observance of morality and the performance of good works. We say, if any there be, because there is reason to suppose that the accounts of earlier antinomians contain much exaggeration, and that there never was any body of men, worthy to be called a sect by numbers and duration, which professed the above opinion. The name was first applied to the followers of John Agricola, a townsman and contemporary of Luther, born at Eisleben in Saxony. The assembly of divines in 1643 condemned several writings which appeared to them antinomian; and the parliament in 1648 enacted that any one convicted, on the oaths of two witnesses, of maintaining that the moral law of the Ten Commandments is no rule for Christians, or that a believer need not repent or pray for pardon of sin, should publicly retract, or, on his refusal, be imprisoned till he found sureties that he would no more maintain the same.

ANTI'NOUS, a native of Bithynia, and favourite of the Emperor Hadrian, the extravagance of whose attachment was shown by the institution of divine honours to Antinous after his death. Respecting the circumstances of his death there are many stories; but it seems generally agreed that he was drowned in the Nile while Hadrian was in Egypt. The town near which he died was rebuilt by the emperor, and called *Antinoe* or *Antinopolis*, instead of Besa, its former name.

Its remains exist under the name of Ensené. A new star, which was said to have been then discovered, was called the 'Soul of Antinous.' Among the remaining treasures of ancient sculpture, the statues of Antinous, which are numerous and very similar to each other, rank among the most beautiful. That originally in the collection of Cardinal Alexander Albani is a standing figure in marble. The head looks downwards, with a melancholy expression, which they all bear: the hair in all of them is arranged in the same manner, covering the forehead nearly as low as the eyebrows. The busts of Antinous are also very fine. (Xiphilinus; Bayle, *Dict. Hist.*; Winkelmann.)

ANTI'NOÜS, Constellation. [AQUILA.]

ANTIOCHEI'A, commonly called Antioch, and Antaki, or Antakin, a town in Syria on the left bank of the Asy, the ancient Orontes, 36° 11′ N. lat., 36° 8′ E. long.

Antioch belongs to the Pashalic of Haleb. It stands in the valley of the Orontes, which here forms a fertile plain, about ten miles long and five or six broad. On the W. side of the river is part of the mountain-range of Amánus, and on the E., to the S. of Antioch and bordering close upon it, is the northern termination of the mountains called Jebel Akra, the ancient Casius. The river at Antioch is from 100 to 150 feet wide, and is crossed by a substantial bridge. A large part of the immense walls of ancient Antioch still remain. Mr. Buckingham gives them a circuit of nearly four miles; but this is much less than the amount assigned by ancient authorities. It seems not unlikely, from the quantity of Roman tiles found in the towers, and the mode of their disposition, that the existing walls of Antioch are chiefly Roman work. It appears most probable that the present walls are those which were erected by Justinian, after the town had been ruined by the Persians. Mr. Buckingham says that one portion of the wall and towers in the S. W. quarter is perfect.

Antioch is still one of the large towns of Syria: the population is stated at about 10,000, but it does not appear to be well ascertained. The houses are chiefly built of stone, pent-roofed, and covered with red tiles. The streets are narrow, with a raised pavement on each side for foot passengers. The bazaars are numerous, and contain a good supply of such articles as are in demand in the country about Antioch. The manufactures of the place are coarse pottery, cotton cloth, silk twist, leather, and saddlery. The language of the Mohammedans at Antioch is generally Turkish; there are a few Christian families there, and some Jews. The air of Antioch is reputed to be more salubrious than that of Halab (Aleppo.) The remains of an aqueduct exist to the south of the city.

Antiocheia was founded by Seleucus Nicátor, and received its name from his father Antiochus. Antioch became the residence of the Syrian kings, and one of the largest cities of the world. It probably grew still larger under Roman dominion, when it was the residence of the governor of Syria, the seat of pleasure, and the centre of an extensive commerce. Strabo (p. 750) describes Antioch in his time as consisting of four distinct quarters, each having a wall of its own, and the whole surrounded by a common wall. The geographer says it was little inferior in extent and wealth to Seleuceia on the Tigris and Alexandria in Egypt. Under Libanius, a native of the place, it became in the fourth century a celebrated school of rhetoric. But before this period Antioch had also become the chief station of the Christian religion, which had been established here by Barnabas and Paul; and here (Acts xi. 26) the name of Christians was first given to the disciples.

Antioch continued to be a city of great importance, notwithstanding the frequent earthquakes, till Chosroes, the Persian, nearly levelled it with the ground. It was rebuilt by Justinian, and again became a considerable place, and continued so till the time of the Crusades. Antioch, after it was taken by the Crusaders under Godefroy and Boemond (A.D. 1098), became a Christian principality under the European conquerors of Syria. The Sultan Bibars, in 1269, took it from the Christians and destroyed its churches. It afterwards passed under Turkish dominion, but has never recovered its commerce and importance, which were transferred to Haleb. Antioch was taken possession of by Ibrahim Pacha Aug. 1, 1832, but was subsequently restored to the Porte.

Great numbers of medals and engraved stones have been found near Antioch. The most interesting are those of the Seleúcidæ, and next to them, those of the period of Julius Cæsar and Augustus.

The last great earthquake at Haleb, in 1822, extended also to Antioch, and did some damage.

(Strabo; Mannert's *Syrien*; Brown's *Travels*; Buckingham's *Travels among the Arab Tribes*; *Journal of Education*, No. II. p. 249.)

ANTIOCHEIA, or *Antioch in Pisidia*, in Asia Minor, was situated, according to Hamilton ('Researches in Asia Minor,' &c.), in 38° 18′ N. lat., 31° 23′ E. long. The ruins were discovered by Arundel in 1833, and are described in his 'Discoveries in Asia Minor,' vol. i. p. 268, &c. This is the town in which St. Paul, accompanied by Barnabas, preached the gospel as mentioned in Acts, chap. xiii. The principal remains consist of the piers and arches of a magnificent aqueduct, which conveyed water to the town, and of the walls and foundations of temples and churches and a small theatre. The site, an elevated plateau, is strewed over with huge blocks of marble, broken columns, highly finished cornices, and other indications of the former architectural grandeur of the city. Antioch was not actually in Pisidia, but in Phrygia, and is called by Strabo 'Antioch near Pisidia.' (Strabo, p. 569, 517, ed. Casaub.) The ruins of Antioch are about a mile and a half from the town of Yalobatch.

ANTIOCHUS, a name best known from its being borne by many Syrian monarchs of the Seleucidan dynasty.

ANTIOCHUS SOTER, or 'Preserver,' was the son of Seleucus Nicátor, or the 'Conqueror,' who

after the death of Alexander raised Syria into an independent kingdom.

Upon the murder of Seleucus, B.C. 280, Antiochus succeeded to the throne, and reigned nineteen years. He prosecuted his father's claim to the kingdom of Macedonia against Antigonus Gonátas, son of Demetrius, who was his brother-in-law; but the dispute was accommodated by a marriage between Antigonus and Phila, daughter of Seleucus and Stratonice, in consideration of which the Macedonian prince was allowed to retain the peaceable possession of his throne. Demetrius, the son of Antigonus, also married Stratonice, the daughter of Antiochus. Antiochus defeated the Gauls, who had crossed into Asia and settled in Galatia. He died B.C. 261.

(Appian, *Syriaca;* Justin, book xxvii.; *Anc. Univ. Hist.* vol. viii.)

ANTIOCHUS THEOS, or 'God,' son of Antiochus Sutor, succeeded his father. The Parthians, B.C. 250, under A'rsaces, expelled the Macedonians from their country, and Arsaces became the founder of the Parthian empire. Bactria, and other provinces east of the Tigris, followed this example: and Antiochus, apprehensive of the final loss of those regions, concluded a treaty of peace with Ptolemæus Philadelphus, B.C. 252, by which he agreed to repudiate his wife Laódice, and to marry Berenice, daughter of the king of Egypt. These conditions were fulfilled: but on the death of Ptolemæus, two years afterwards, Antiochus restored Laódice to her conjugal rights, and in return was poisoned by her, B.C. 247, with the view of securing the succession to her eldest son, Seleucus Callinicus. (See Schlosser's *Remarks on the Reign of Antiochus* II., *Universal historische Uebersicht*, &c.)

ANTI'OCHUS THE GREAT was the son of Seleucus Callinicus, and succeeded his brother Seleucus Ceraunus, B.C. 223. The young king appointed governors to preside over the several districts of the Syrian empire, which during preceding reigns had lost much of its territory. The kingdom of Pergamus had profited by the weakness of the Seleucidan dynasty: but under the able management of Achæus, the cousin-german of Antiochus, those provinces which had been wrested from the Syrians were recovered, and Attalus of Pergamus was confined within the limits of his proper kingdom.

Achæus, who had been a faithful friend of Antiochus, finding that plots were laid against his life by those who were in the king's confidence, proclaimed himself king of those provinces in Asia Minor, which he had recovered, and which had been entrusted to his charge. Ptolemæus Philópator still held Cœlesyria and Palestine, which had been conquered by his predecessor, Euérgetes. Antiochus first took arms against Egypt, and among other places he recovered Damascus. A truce was made between Ptolemæus and Antiochus, but it expired before anything was agreed to, and war was resumed B.C. 218. Antiochus penetrated into Phœnicia, and gained possession of Galilee and the tracts east of the Jordan. But in the following year he was totally defeated at Raphia, near Gaza, and obliged to retreat to Antioch. The Syrian king, pressed by Achæus, was compelled to sue for peace with Egypt, which he obtained on condition of resigning his claim to the contested provinces. Antiochus now turned his whole attention to the destruction of Achæus, whom he overpowered and put to death: and the provinces of Asia Minor were again annexed to the Syrian empire, B.C. 213.

Arsaces, the son of him who established the Parthian empire, had overrun Media while Antiochus was engaged in the wars against Ptolemæus and Achæus. The Syrian king invaded Parthia, and after several campaigns Arsaces was left in possession of Hyrcania, on condition of his assisting Antiochus to recover the rest of the revolted provinces. After an unsuccessful attempt to recover Bactria from Euthydémus, with whom he concluded a treaty, he re-established the supremacy of Syria in the provinces between the Indus and Persia. He returned through Persia to Antioch, having been employed for seven years in these eastern campaigns, in which he earned the title of 'Great.'

Ptolemæus Epíphanes, a child of five years old, succeeded to the throne of Egypt, B.C. 205, on the death of his father, Philópator. Antiochus, and Philip, king of Macedonia, united in a design to expel him, and share the Egyptian dominions between themselves. Antiochus regained possession of Palestine and Cœlesyria in two campaigns; and he entered Jerusalem, B.C. 198, where he was received by the Jewish people with great joy. Antiochus then proposed a treaty of marriage between his daughter and the young king of Egypt, by which Cœlesyria and Palestine were to be given with the princess as a dowry. He now proceeded with a powerful fleet round Asia Minor, crossed the Hellespont, and took possession of the Thracian Chersonese, B.C. 196, which belonged to Philip, king of Macedonia; and here he came in contact, for the first time, with the power before which his own was compelled to retire. The Romans had already reduced Macedonia to the condition of a subject kingdom, and, being jealous of this interference in European affairs, they sent ambassadors to require restitution, not only of all that Antiochus had taken from Philip, but of all that he had taken from Ptolemæus, whose guardians, soon after his accession to the throne, had placed him under the protection of the Romans. Antiochus replied to these requisitions in terms as haughty as those in which they were made. (Polybius, xviii. 33, ed. Bekker.)

In B.C. 195, Hannibal, driven from Carthage, came to Ephesus to seek the protection of the king of Syria; and his representations induced Antiochus to match his strength against the power of Rome. In the winter of 192 B.C., Antiochus, at the invitation of the Ætolians, crossed over into Greece with an army, posted himself in the town of Demétrias, and was chosen by the Ætolians as their commander-in-chief. Antiochus captured Eubœa, but he did not push on his conquests with vigour. The Roman consul, Acilius Glabrio, defeated the Syrian king at Thermópylæ, and he was compelled to retire to Asia, B.C. 191. The next year L. Cornelius Scipio was consul, and appointed

to conduct the Syrian war, and his brother, the celebrated Africanus, served under him in the quality of lieutenant. Antiochus withdrew his forces from Europe, and the Romans crossed the Hellespont. He now offered terms of peace, but the Romans demanded more than he would concede, and he met the consul Scipio, B.C. 190, in a pitched battle near Magnésia, near Sípylus, in which he was defeated with immense slaughter. Antiochus retired to Syria, and yielded to the terms of the conqueror. He was to resign the provinces west of Mount Taurus; to pay 18,000 Euboic talents for the expenses of the war; to deliver up to the Romans his elephants and ships of war; and to place in their hands Hannibal, and other foreigners who had taken refuge at his court. Hannibal, with another, preserved his safety by flight; the rest were delivered up, together with hostages for the observance of the treaty, of whom Antiochus Epíphanes, the king's younger son, was one.

In collecting means to pay the heavy burden imposed upon him, Antiochus plundered a wealthy temple in the province of Elymáis. But the people of the place rose in arms, and massacred him and his attendants, B.C. 187, in the thirty-seventh year of his reign, and fifty-second of his age. Antiochus did more to restore the greatness of the Syrian kingdom as under the first Seleucus, than any other of his dynasty; but he was unfortunate in meeting the first shock of that power before which all the kingdoms of the known world were destined to fall.

(Polybius, lib. 5, &c.; Appian, *Syriaca;* Liv. lib. 36, 37; Raleigh, *Hist. of World; Anc. Univ. Hist.*, vol. viii.)

ANTIOCHUS EPI'PHANES, or 'Illustrious,' the second son of Antiochus the Great, succeeded his elder brother Seleucus Philópator, B.C. 175 or 176. Antiochus was, at the time of his brother's death, on his way from Rome, where he had been a hostage. Egypt now reclaimed the provinces of Palestine and Cœlesyria, wrested from her by Antiochus the Great. In the first campaign, B.C. 171, Antiochus routed the Egyptians between Mount Casius and Pelusium, and fortified the frontiers of Palestine against farther aggression. In the next year he overran Egypt, except the strong city of Alexandria, and gained possession of Ptolemy Philométor, the young king. In the same year he sacked Jerusalem, and profaned and plundered the temple, as related in Maccabees, (i. c. 1, and ii. c. 5); after which he appointed Philip the Phrygian governor of Judæa. The Alexandrians having raised Ptolemy Euérgetes, commonly called Physcon, the brother of Philométor, to the throne, Antiochus again invaded Egypt, B.C. 169, and laid siege to Alexandria. Being unable to reduce that city, he left Philométor as the nominal king of the country; but the two brothers agreed to hold the kingdom in common, and Egypt was restored for a time to tranquillity. Hereupon Antiochus undertook a fourth expedition, B.C. 168, into Egypt, and was laying siege to Alexandria, when ambassadors from Rome ordered him to leave Egypt, and he obeyed. Returning through Palestine in the same year, he ordered that great persecution of the Jews related in the second book of Maccabees. The vigorous resistance of the Jews induced Antiochus to send a force under Lysias into Judæa, which was totally defeated. Transported with passion, he hastened towards Antioch from the northern provinces, which were in a state of revolt, but he was suddenly attacked by a violent disease, and he died, B.C. 165, in dreadful agony. (Livy, xlii., &c.; Polybius, xxvi.—xxxi., ed. Bekker.)

ANTIOCHUS EU'PATOR, 'son of an illustrious father,' son of Antiochus Epíphanes, a child nine years old, succeeded to the throne, under the guardianship of Lysias. After a nominal reign of nearly two years he was dethroned, and put to death by his cousin-german, Demétrius Soter, son of Seleucus Philópator, who succeeded to the crown, B.C. 162.

ANTIOCHUS, the son of Alexander Balas, was raised up by Diodótus, surnamed Tryphon, as a tool, by the help of which he might displace Demetrius Nicátor, and make his own way to empire. The young protender was seven years old. After a nominal reign of two years he was put to death by Tryphon, who assumed the crown (B.C. 144-2).

ANTIOCHUS, surnamed SIDE'TES, was a younger son of Demetrius Soter, and brother of Demetrius Nicátor. After Nicator was expelled by Tryphon, Sidétes married his brother's wife, Cleopatra, laid claim to Syria, and expelled Tryphon, B.C. 138, who had held it since the murder of Antiochus. His reign was comparatively prosperous and tranquil. He reduced Jerusalem, B.C. 134. He defeated Phraátes, king of Parthia, in three battles, and recovered all which had been wrested from Syria, except the province of Parthia; but he lost his life, B.C. 129 or 128, in a sudden attack which the enemy made on his winter quarters.

ANTIOCHUS GRYPUS, or 'Hook-nosed.' After the death of Antiochus Sidétes, Syria was distracted by civil wars. Demetrius Nicátor escaped from Parthia, and resumed the crown; but he was soon dethroned by Alexander Zebinas. Cleopatra, the wife successively of Balas, Nicátor, and Sidétes, retained possession, however, of a portion of Syria; and Seleucus, her son by Nicátor, regained some districts contiguous to those held by his mother, and proclaimed himself king of Syria. This raised her jealousy, and she murdered him with her own hand. She now recalled from Athens her son Antiochus Grypus (named also Philométor, and, on his medals, Epíphanes), B.C. 125. Grypus soon expelled Alexander Zebinas; but Cleopatra became jealous of him also; and she was compelled to drink a poisoned draught, which she had offered to her son. Grypus reigned in peace for eight years; at the end of which a fresh competitor for the throne started up in the person of his half-brother,

ANTIOCHUS, surnamed CYZICE'NUS, from being educated at Cyzicus, the son of Cleopatra by Antiochus Sidétes. After a sharp contest the brothers agreed to divide the empire, B.C. 113 or 112: Cyzicénus occupied Cœlesyria, and Palestine; Grypus, the rest of the empire. Grypus

was assassinated, B.C. 96. Cyzicénus was defeated and slain by Seleucus, the son and successor of Grypus, B.C. 95. Seleucus perished, after a reign of seven months.

ANTIOCHUS EU'SEBES, 'the Pious,' son of Antiochus Cyzicénus, proclaimed himself king of Syria upon his father's death. For a time he disputed the throne with his cousins, Philip and Demetrius Eukæros, sons of Grypus: but, B.C. 88, he was compelled to fly into Parthia. He returned, B.C. 86, Eukæros being dead or banished: and while he was engaged in war with Philip, another Antiochus, surnamed Dionysius, full brother to Philip, seized upon Cœlesyria. The latter was soon slain in a war against the Arabians. After a brief period, the Syrians, wearied by the desolating feuds of the Seleucidan princes, invited Tigranes, king of Armenia, to take possession of the country. Eusebes then fled into Cilicia, B.C. 83, and passed the remainder of his life in obscurity. The events of his reign are very confused.

ANTIOCHUS, surnamed ASIA'TICUS, was the son of Antiochus Eusebes. Tigranes being obliged to withdraw his troops from Syria to make head against the Romans, Asiaticus gained possession of part of the kingdom, B.C. 69. He retained it for four years, at the end of which Syria was reduced by Cn. Pompeius to a Roman province, B.C. 65. In Antiochus Asiaticus, the Seleucidan dynasty ended, having ruled Syria for 247 years, from the time when Seleucus Nicátor began his reign in B.C. 312. (For the chronology of the Syrian kings the reader should consult Clinton's *Fasti Hellenici.*)

ANTIOCHUS OF COMMAGE'NE. [COMMAGENE.]

ANTI'PAROS, called by the ancients O'learos, one of the group of the Cyclades, is situated between Siphnos and Paros, and separated from the latter by a dangerous channel one mile and a half wide. It is 7 miles long, 3 broad, and contains one small village, with about 300 inhabitants; its products consist only of poor wine, and a little cotton and barley. The island is a mass of white marble, and is celebrated for its grotto, the entrance to which is by a low arch formed of rough craggy rocks, about thirty paces wide, and divided into two by natural pillars. The grotto, which is reached after several passages and descents, is 120 yards long, 113 wide, and 60 feet high; it is an immense arch of white marble, from the roof of which depend large stalactites 10 feet long, and as thick as a man's waist, with festoons and leaves of the same substance; the floor is rough and uneven, with various coloured crystals and stalagmites rising up; and in the midst is one 20 feet in diameter, and 24 feet high. When lighted up, the whole presents a most brilliant and magnificent scene, but the smoke from the torches of the numerous visitors has somewhat dimmed its effulgence.

ANTI'PATER, a Macedonian of high birth, the chosen and trusted officer of Philip and of Alexander the Great. He was the pupil and friend of Aristotle; he was learned himself, and the patron of learned men. When Alexander left Europe for Asia, he entrusted the government of Macedonia and the regulation of Greece to Antipater. During the year B.C. 331, an attempt was made by Lacedæmon, Achaia, Elcia, and the greater part of Arcadia, to deliver Peloponnesus from the supremacy of Macedonia, which the vigour of Antipater completely defeated. [AGIS III.]

Alexander had given his mother Olympias no share in the administration of Macedonia, and accordingly this dangerous woman attempted to excite in her son a jealousy and distrust of Antipater. Shortly before his death Alexander sent home Cráterus to assume the administration of Macedonia, and with orders to Antipater to conduct fresh troops to Babylon. Alexander died before Craterus reached Greece. The late king's brother Arrhidæus, a bastard son of Philip, was raised to the throne by the Macedonian generals and the army in Asia; and Perdiccas was appointed viceroy over the king, who was a young man of weak intellect.

In the distribution of provinces among the chief officers of Alexander, Antipater was confirmed in the possession of Macedonia and the adjacent countries. He was soon provided with employment. Athens put herself at the head of a powerful confederacy, comprising the Ætolians, Thessalians, and almost all the Greeks north of the Isthmus, except the Bœotians; and of Peloponnesus, the Argeians, Eleians, Messenians, and Sicyonians; the object was to liberate the cities of Greece which were held in check by Macedonian garrisons. In a battle which was fought somewhere between Thermópylæ and Lamia in Thessaly, Antipater was defeated by the allied army under Leósthenes, an Athenian, and he retreated to Lamia.

Leonnatus, one of Alexander's generals came to help Antipater. A battle ensued, in which the Macedonians were beaten, and Leonnatus was killed. Craterus now arrived from Asia with 12,500 veteran troops, which he placed under the command of Antipater. An indecisive battle ensued; but the allies now felt their inferiority too much to risk another encounter, and sent to treat of peace with Antipater. This, called the battle of Cranon, occurred in August, B.C. 322. Antipater refused to treat with the confederates collectively, but expressed his willingness to come to terms with them severally. After a time, the several members of the confederacy dropped off by degrees, and left the Athenians and Ætolians to secure their safety as they could. Antipater marched with his whole force against Athens; and the citizens sued for peace. Antipater required the orators Demosthenes and Hyperides to be delivered up, that a Macedonian garrison should be henceforth quartered in Munychia, and that all political power should be vested in a body of about 9000 citizens, who were possessed of property up to a certain amount. Thus ended the Lamian war, as it is called, in the autumn of B.C. 322. Antipater returned to Macedonia.

In the same autumn, Antipater and Craterus marched against the Ætolians, who, after a vigorous resistance, were almost reduced to despair, when they were relieved by unexpected news from Asia.

The ambition of Perdiccas had led him to aspire to be Alexander's successor. One of his first steps was to rid himself of Antigonus, who fled to Antipater, and apprized him of their common danger. To check Perdiccas in time was more important than to punish the Ætolians; and after concluding a hasty peace with the brave mountaineers, Antipater and Craterus led their army into Asia. Craterus took the field against Eúmenes, satrap of Cappadocia and Paphlagonia, by whom he was defeated and slain; while Antipater marched into Cilicia to meet Perdiccas. But Perdiccas in the meantime had been slain in Egypt; and the Macedonian troops elected Antipater to the office of regent. These transactions seem to have taken place in 321, but there is some confusion in the chronology. [ANTIGONUS.] In this new capacity he made a fresh distribution of the provinces; after which he returned to Macedonia, taking with him the king and queen, Arrhidæus and Eurýdice, and leaving Antigonus to conduct the war against Eúmenes. This seems to have been in 320.

Antipater held the regency undisturbed till his death in 318. In his last illness he put to death the orator Démades and his son, who had been sent ambassadors by the Athenians to request that the Macedonian troops might be removed from Munychia.

Antipater left the regency to Polysperchon, one of the oldest of Alexander's surviving generals; but Cassander, the son of Antipater, contested the possession of Macedonia with Polysperchon, and finally became master of that kingdom. Antipater died in his eighty-first year, having enjoyed a high reputation for his talents as a minister, and leaving a character less stained by cruelty than most of the contenders for empire who sprang up after the death of Alexander.

(*Diodorus*, book xviii., &c.)

ANTI'PATER, son of Antipas, the governor of Idumæa, was himself a native and governor of that province during the high-priesthood of Alexander Jannæus. After that prince's death, his sons, Hyrcánus and Aristobúlus, disputed the succession. Antipater was a zealous partisan of Hyrcanus, who, after a bloody contest, was established in the high-priesthood by Pompeius the Great; and Antipater ruled in Judæa in the name of his weak master. Cæsar, during the siege of Alexandria, received aid from Antipater, and in return he appointed him to the administration of Judæa. Antipater was poisoned by a Jew named Malchus, B.C. 49, through jealousy of his influence with Hyrcanus. Antipater left four sons, of whom two are known in history: Phasael, governor of Jerusalem; and the infamous Herod, king of the Jews.

ANTIPATER, L. COELIUS, a Roman historian of the Second Punic War. [COELIUS.]

ANTI'PATHY (from the Greek ἀντιπάθεια, compounded of ἀντί 'contrary,' and πάθος 'feeling'), properly signifies an involuntary dislike or aversion entertained by an animate being for some sensible object. Many antipathies are natural, and do not arise from any accidental circumstance; such as the aversion to the tastes and smells of many drugs, and of bodies in a state of putrefaction. Such natural antipathies may, however, in many cases, be overcome by habit. Some nations constantly eat food which the rest of mankind would nauseate, as the Esquimaux, who live on whale blubber and train oil. Many antipathies, however, are not natural, but acquired, and arise from our associating certain objects with the idea of something terrible or dangerous. Thus people acquire antipathies to spiders, earwigs, wasps, snakes, rats, and other animals, from forming exaggerated notions of their powers of harming mankind; and, by encouraging such aversions, they may acquire so great sensitiveness and acuteness in distinguishing these animals by the smell, sight, or hearing, that they may be aware of their presence when other people are unconscious of it.

ANTI-PAXO. [PAXO.]

ANTI'PHILUS, a celebrated Greek painter, who lived in Egypt in the time of Ptolemy Philopator, at the close of the third century B.C. He is praised by Quintilian for the facility with which he painted, and Pliny mentions several of his works, in various styles. Antiphilus was also the inventor of a kind of caricatures called *Grylli*. They were a species of grotesque monsters, part man and part animal or bird, of which the Greeks and Romans appear to have been fond.

ANTIPHLOGISTIC TREATMENT (from two Greek words ἀντί 'against,' and φλόγωσις, 'inflammation') is the means of removing or lessening inflammation, and of obviating its effects. We shall here briefly notice the chief of these means.

One of the effects of inflammation is to produce effusion of the serum or lymph of the blood, the extent of which depends on the quantity of blood which goes to the parts affected. The processes of inflammation, in its earlier stages, may be very certainly restrained or arrested by diminishing that quantity. This is done by abstraction of blood, either local or general. If the inflammation be allowed to proceed, suppuration, ulceration, or other changes, and destruction of parts, according to the texture affected, will ensue. Now abstraction of blood, though it may prevent the extension of suppuration and ulceration to parts not yet affected, is rarely found effectual in checking the formation of pus, where that has been already established. We see then the necessity of the early employment of bleeding, and the other antiphlogistic means, if we desire them to be productive of the greatest amount of benefit. During inflammation of shut sacks, or cavities, *i. e.* those cavities of the body which do not communicate with the external air, and which are lined with serous membranes, the disposition to effusion of much lymph, or the albumen of the blood, is greater than in other cases. To prevent this, more prompt and vigorous measures must be used. Modern physicians have ascertained that mercury, especially in combination with opium, has a powerful influence, not only in preventing the effusion of lymph, but in removing it soon after it is effused. This, then, constitutes another valuable antiphlogistic means. The other agents

employed are purgative nauseating medicines, diaphoretics, and refrigerants. In addition to such remedies, the antiphlogistic treatment embraces strict attention to diet, preventing an undue supply of heating nutritious food, and also absolute rest. Whatever organ is inflamed should, as much as possible, be relieved of performing its usual functions.

A'NTIPHON, the son of Sophilus, the oldest of the Athenian orators, who are generally known under the denomination of the 'ten,' belonged to Rhamnus, a *demos*, or township of Attica, and was born about B.C. 480. He opened a school of rhetoric, and numbered among his pupils Thucydides, the historian of the Peloponnesian war, who, in a passage of his eighth book, has commemorated the talents of his master, and recorded almost the only completely trustworthy event in his life. It was the profession of Antiphon to write speeches for persons who had either to defend themselves in courts of justice, or wished to proceed against others, and also for those who had to address the public assemblies. According to several authorities, he is the oldest writer who composed speeches for the courts of justice; no speeches of this character of higher antiquity are preserved. In the year B.C. 411, and in the latter part of the Peloponnesian war, a revolution was effected by which the Council of Five Hundred was abolished, and all political power was vested in a body of four hundred. Antiphon was the real author of the revolution, and Pisander, who appeared as spokesman, was merely his agent. Shortly after this change, Antiphon and Phrynichus, with ten others, were sent to Lacedæmon to make peace, but they returned without effecting their object. Discontent grew stronger; Phrynichus was assassinated, a counter-revolution was effected, and Alcibiades was recalled. Antiphon, now seventy years of age, was tried for his life on a charge of treason to the state; he made, according to Thucydides, an admirable defence. His sentence (according to the decree quoted by Cæcilius in the 'Life of Antiphon,' attributed to Plutarch), was death; his property was confiscated, his house was pulled down, and the site was marked by stones bearing the inscription, 'Antiphon the Traitor.' Antiphon, says Thucydides, was inferior to no Athenian of his time in virtue; he had also the greatest talents for conceiving any plan, and equal talent in expressing his conceptions. Thucydides says nothing about the sentence or the death of Antiphon.

Antiphon wrote a treatise on Rhetoric, which is lost. There are fifteen extant orations of Antiphon, three of which are on subjects which were matters of judicial investigation, and are well worth reading. The other twelve are merely rhetorical exercises, such as those to which Cicero alludes when speaking of Antiphon. ('Brutus,' c. 12.) The orations of Antiphon are in Reiske's collection, and in Bekker's *Attic Orators*.

(Van Spaan, *Dissertatio de Antiph. Orat.*)

ANTIPHONARY, ANTIPHONA'RIUM, in music, the book wherein the *antiphonies* were written; and one of which was kept in each church and monastic establishment. Such books were often very ornate and costly.

ANTI'PHONY, in music (ἀντιφωνία, alternate singing), the ancient name for a kind of anthem, the verses of which were chanted by each side of the choir alternately. St. Ambrose introduced it in the western churches about the year 374. The chanting of the psalms in our cathedrals is a close imitation of the ancient antiphony.

ANTI'PODES, a term from the Greek, meaning literally those who stand feet to feet, as is the case with the inhabitants of two opposite points of the globe. Previous to the establishment of the rotundity of the earth, and during the centuries of discussion which took place upon this point, the existence of antipodes was the theme of constant ridicule in the mouths of the opposers of the globular figure. (Lactantius, 'De Falsâ Sapientiâ,' cap. 23, who wrote in the beginning of the fourth century A.D.)

Two *antipodal* points of the earth have the same number of degrees of latitude, one north and the other south, unless one of the points be on the equator, in which case the antipodal point is the opposite point of the equator. Their longitude differs by 180° or 12 hours, if we reckon longitude all round the globe; but if we use east and west longitude, the two longitudes must together make up 180° or 12 hours, one east and the other west. We here insert, in opposite columns, the names of a few places which are nearly antipodal.

London . .	Antipodes Island, S.E. of New Zealand.
Nankin. . .	Buenos Ayres.
Bermudas . . .	Swan River.
Quito	Middle of Sumatra.
Azores	Botany Bay.

Antipodal places have the same climate, so far as that depends merely on latitude; but have all the seasons, days and nights completely reversed. Thus, noon of the longest day at the Bermudas is midnight of the shortest day at the Swan River. The remark as to the seasons of course does not apply to antipodal places on the equator.

ANTIQUARIES, SOCIETY OF. In 1572, a few eminent scholars, under the auspices of Archbishop Parker and Sir Robert Cotton, united their efforts for the preservation of the ancient monuments of their country. This society admitted members till 1604; about which time King James I. thought fit to dissolve it. In 1707, a number of gentlemen, attached in a similar manner to the study of our national antiquities, agreed to meet weekly for the same purposes as the former society.

In 1717 the members re-founded, or rather reconstituted, their society, and made their first election of officers. The minutes of the society begin January 1, 1718; whence it appears that every member, or whoever was admitted to be present, brought from time to time whatever they had of their own, or their friends', that was curious or uncommon: as coins, medals, seals, intaglios, cameos, manuscripts, records, rolls, genealogies, pictures, drawings, printed books, extracts, or even memoranda; a few produced dissertations. In 1750, it was unanimously resolved to petition the king for a charter of incorporation on the

plan formed in 1717, with improvements. This was obtained in the following year, when his majesty having declared himself 'Founder and Patron,' the society became incorporated by the name of 'President, Council, and Fellows of the Society of Antiquaries of London.' In 1781 the society removed to Somerset Place, where King George III. had granted them appropriate apartments. The election of members is by ballot. Every member pays an admission fee of eight guineas, and four guineas a year; or an additional sum of forty guineas to the admission fee, to be constituted a member for life. The society's meetings are held on Thursdays, from seven o'clock in the evening till nine, in apartments adjoining to those of the Royal Society, in the front building of Somerset Place. The society has published several valuable works, in addition to the large collection of its transactions known as the 'Archæologia.'

ANTIQUES. This term properly refers to works of Grecian art in sculpture, bas-relief, engraving of gems, medals, &c. As these arts flourished in the states of Greece, and also under the Roman Empire (though most probably they were always successfully cultivated chiefly by Greeks), it is not possible to find any precise chronological limits that shall determine whether a work of art belongs to the *antique* or not. Still, as there was under the Roman Empire a great and progressive deterioration in the arts above alluded to, until in more recent times they have been again improved, it is clear that many works of considerable antiquity cannot be classed under the head of *antiques;* for by the term antiques we understand, in general, works that have decided merit, and may serve as models for imitation; or they are at least works of art that serve to illustrate and explain those ancient authors whose writings, by common consent, are allowed to be deserving of study.

ANTIQUITY. [ANCIENT, ANCIENTS.]

ANTIRRHI'NUM, a genus of plants belonging to the natural order Scrophulariaceæ. This genus is the type of a section of the order to which also the genera Linaria, Anarrhinum, Maurandia, Galvesia, Lophospermum, and Rhodochiton belong. The species are annual or perennial, rarely shrubby. Two of the species are indigenous to Great Britain. All of them produce showy flowers, and are much cultivated in gardens. Their medicinal properties are not very active.

A. Majus; Great or Common Snapdragon, attains a height of one or two feet, and has purplish-red or white flowers. It is found in Great Britain on old walls and chalk cliffs, especially in the neighbourhood of London, but it is undoubtedly a naturalized plant, being truly indigenous in the south of Europe and the north of Africa. In gardens a variety is often seen with double flowers. The leaves are bitter and slightly stimulant. Gmelin says that in Persia an excellent oil equal to that of the olive is procured by expression of the seeds of *A. Majus.*

A. Orontium, Orontium Snapdragon or Calves'-Snout, is a native throughout Europe, in the islands of the Mediterranean, and the north of Africa. It has been found in Virginia, but it has been probably introduced. Its leaves, as well as those of other species, have been used as cataplasms in indolent tumors.

There are twelve other species, many of which have been introduced into our gardens. They are pretty border-flowers, and adapted for rock-work. They are easily cultivated: the perennial species may be increased by cuttings, and the annual raised by seeds. The species from subtropical districts will, however, require a frame or the greenhouse in the winter.

(Babington, *Manual of British Botany;* Don, *Gardner's Dictionary.*)

ANTIS. A portico is said to be *in antis* when columns stand in a line, in front, with the antæ or projecting ends of the side walls of the temple or other building. There is a good example of the portico *in antis* in North Audley Street, London, which forms the entrance to an episcopal chapel.

ANTI'SCII, an old astronomical term derived from the Greek, signifying those whose shadows are in opposite directions. It is applicable, during part of the year, to any two persons, one or both of whom reside within the tropics; and during the whole year, to any two persons, neither of whom lives within the tropics, and both in different hemispheres.

ANTISCORBUTICS (from ἀντί), 'against,' and *scorbutus,* a barbarous word, intended as the Latin for *scurvy*), the remedies, real or reputed, against scurvy. The term scurvy is popularly, but incorrectly, given to two distinct diseases, which arise under different circumstances, spring from different causes, present few symptoms in common, and are cured by means not only unlike, but diametrically opposite. The confusion has crept in owing to the skin in true scurvy occasionally, but by no means invariably, peeling off in scales or scurf; while in the other disease or diseases, improperly termed scurvy, desquamation, or other affection of the skin, is an essential and invariable symptom, the portions or scales of which being commonly called scurf, the adjective scurfy has insensibly come to be used as a substantive, and to be applied indiscriminately to the two diseases. The one occurs mostly at sea, hence called sea-scurvy, and is owing to temporary causes, capable of affecting persons of any constitution; the other occurs mostly on land, is owing to more permanent causes, and is always connected with a peculiar constitution. The necessity of making this distinction is manifest, since the remedies for the one disease are few and certainly efficacious, the medicines for the other are multifarious and generally very inefficacious. This circumstance points out an essential difference between the two disorders.

The other diseases to which the name of scurvy has been improperly given, and some of the remedies for which are termed antiscorbutics, have no connection with sea-scurvy, or its remedies. These various affections of the skin are more or less connected with a scrofulous constitution, to which are owing the disordered functions of the digestion, whence these eruptions spring. Acidity in the stomach is a concomitant and characteristic

symptom of these diseases, for the cure of which vegetable acids are unavailing, though the mineral acids, by their strengthening virtues, are often serviceable. These so-called scorbutic affections are of very frequent occurrence among persons subject to gravel and gout, which are, at the commencement, caused by acidity in the stomach: the appropriate means of cure for both complaints are alkalies [ANTACIDS], the very opposite of the means useful in true scurvy.

The nostrums vended under the name of anti-scorbutics, and intended for these cutaneous diseases, though varying in their composition, mostly contain, as their active principle, some preparation of mercury, often a very poisonous one, which is always hurtful in sea-scurvy, and can only be serviceable in particular cases of the other kinds. Its use requires the greatest caution, directed by the utmost skill; the employment of such articles should, therefore, be carefully avoided.

Sea-scurvy formerly prevailed in a very extensive degree. Commodore Anson, in the course of his voyage round the world, lost above four-fifths of his men, and when he arrived at Juan Fernandez, of the two hundred men then surviving, eight only were capable of duty. An entire crew has sometimes fallen a victim to it, and the ship been left without a single hand to guide it through the waters. This happened in the case of the Spanish ship Oriflamma, in which the whole crew perished, and in this state she was discovered with the dead bodies on board.

The usual symptoms of this disease are a want of a natural and healthy colour: the skin, first of the face, and afterwards of the rest of the body, becomes pale, and assumes a bloated appearance; the lips, instead of a rich vermilion, acquire a greenish tinge: indeed, the countenance in this disease is always very much depressed, indicating a corresponding state of mind. The patient is conscious of weariness, and is averse to exertion; and when that of a bodily kind is attempted, his unfitness for it is seen by the weakness of the knees (which often become stiff and contracted) and of the whole muscular system, greatly increased frequency of breathing following the least effort. The skin is dry, sometimes rough, but more generally smooth and shining, with spots of a red, blue, or black appearance, according to the length of time that the blood has escaped from the vessels, which is the cause of these stains. The limbs become dropsical, the gums spongy and swollen; ulcers or any sores, cuts or scratches, bleed profusely, and cannot be healed; even old ulcers break out anew, and broken limbs, apparently firmly united, separate again, and cannot be reunited so long as the disorder continues. The blood when drawn scarcely coagulates, but remains loose and flabby; yet during the whole of this state the appetite generally continues good. These symptoms all denote great debility, which is occasioned by a peculiar alteration of the blood, and is produced by the causes we have now to mention.

The causes of this disease appear to be exposure to a cold and damp atmosphere, excessive fatigue, badly ventilated sleeping apartments and intemperance; but none of these causes singly, nor indeed all of them combined, are adequate to produce scurvy, unassisted by some specific cause, which cause is to be found in the *diet*. The diet of seamen during long voyages was formerly merely salted meat and biscuit; fresh animal food or recent vegetables formed no part of it. It was also often deficient in quantity.

Salt, if taken in moderation, facilitates digestion, but, if in excess, hinders the digestion of the food, even of fresh meat and vegetables; when employed as a means of preserving meat, it hardens it, and impairs its nutritive power, as well as renders it more difficult to digest. Such meat is less nourishing, but more stimulating than fresh meat, and its long-continued use produces what may be termed the disjunctive inflammation, owing to which old wounds and ulcers break open, and fractured bones separate after reunion. The salt seems to be pernicious in a twofold way; first, by lessening the nutritious power of the meat; and, secondly, by its stimulating properties. The former of these, unaided by the latter, is sufficient to produce scurvy, if the predisposing causes of cold, moisture, and imperfect or excessive exercise be in operation. The diminution of the *quantity* of food, and not its *quality*, was the principal exciting cause of scurvy in the Milbank Penitentiary in 1819.

Fresh vegetables, vegetable substances, or articles prepared from them, constitute the *antiscorbutics*, or means of preventing and curing sea-scurvy; but they are not all of equal value, some far surpassing others in efficacy. Those are the least valuable in which no vegetable acid greatly predominates, so as to impart to them an acid or acidulous taste. Hence the cruciferæ are not so useful in their natural state as the name of *scurvy*-grass, bestowed on one of them, would seem to indicate; but when by their fermentation, as that of cabbages to form sour-kraut, a vegetable acid is produced, their antiscorbutic power is increased. But at the head of all the hesperideæ deserve to be placed, the members of which contain citric acid: accordingly any of the species may be employed; but the most powerful belong to the genus *Citrus*, especially the *citrus limonum* (Risso), the well-known lemon, since the introduction of which into the navy, in 1796, scurvy has almost ceased. It may be used in various ways; the best is in the form of the fresh fruit, sucked by the patient: but in the absence of this, lemon-juice may be employed, and this is the usual mode in the naval practice. A quantity of it, having a tenth-part of spirit of wine added to preserve it, are supplied to each ship, and in about a fortnight after leaving port its use is begun; each sailor is allowed one ounce of it and one ounce and a half of sugar to mix with the grog, or in many instances with wine, a stated quantity of which is granted in lieu of a certain quantity of spirits, which is withdrawn. This has the effect of almost invariably preventing scurvy affecting any of the crew; but, should symptoms of the disease begin to show themselves, they quickly disappear by an increase of the quan-

tity of lemon-juice. Citric-acid, which has been crystallized and again dissolved in water, is not so efficacious; neither is vinegar, nor any other vegetable acid, such as tartaric, or malic, so useful, though the fruits containing them (such as unripe gooseberries and tamarinds) are the best substitutes for lemons, when these cannot be procured.

In addition to the lemon-juice, ships intended to be sent on long voyages are supplied with animal food, so prepared as to be almost as fresh at the end of six years as if it had been killed but a few days and dressed the day previous to its being used. This valuable discovery, which tends so greatly to lessen the inconvenience of a sea-life, as well as to secure the health of those devoted to it, was made by Mr. Appert. [ANTISEPTICS.]

ANTISEPTICS (from *ἀντί*, 'against,' and *σήπω, σομαι*, 'to putrefy'), the means of preventing those changes in organized matter which are comprehended under the term putrefaction.

As the operations of nature in regard to organized matter seem to consist in reducing to their elementary state each individual, or part, when it ceases to live, and in reconstructing other organized bodies, it forms an important subject of investigation to inquire in what way the former of these may be prevented, when it is desirable to preserve the whole or a part of organized matter from putrefaction; by what means can the tendency to putrefaction be so modified, that the result of it, though leading to the formation of a substance having a very different character, shall yet be of a kind which may be preserved for a longer period than the original substance. These inquiries concern the preservation of food, so that the produce of a period of plenty may be stored up as a provision for a time of scarcity, and the superabundant productions of one country may be transmitted in a sound and wholesome state to a distant land. It also concerns the provisioning of our ships, so as to ensure the health of the crews, as far as depends upon a proper supply of animal and vegetable diet.

All organized substances do not putrefy with equal rapidity, nor under all circumstances. Decomposition goes on fastest in substances which contain nitrogen; most slowly in substances which contain carbon: hence animal matters putrefy quickly; vegetable, especially of a woody texture, gradually. The conditions necessary for putrefaction to take place are, the presence of air, of a certain temperature, and moisture. If any one of these be excluded, the process is prevented. The moisture may either be external, or it may be the fluids of the body itself. The bulk of the animal frame is made up of fluids, which must either be dissipated by heat, abstracted by some chemical process, or rendered solid by a very low temperature, if we wish to preserve any animal substance in the state most near that of its natural constitution. The modes of preserving food are either natural or artificial.

The natural modes comprehend those which effect this end by abstracting or excluding one or more of the chief agents,—heat, moisture and air; the artificial comprehend those methods of preparation or mixture which produce some chemical change in the substance.

1st. Abstraction of heat. The presence of heat is essential to the exertion of those chemical affinities which take place during decomposition, or constitute the process; abstracting it therefore checks or suspends them. Most articles of food keep better in cold than in warm weather. When the heat has been so completely abstracted that the juices are frozen, *i. e.* become solid, the preservation of the substance is more effectually accomplished. Indeed they may thus be preserved for many years, perhaps ages.

On this principle the Russians preserve their poultry, which they kill in October, and pack in tubs with layers of snow between. The markets of St. Petersburg are supplied with veal brought from a great distance in this state, as well as with whole hogs, sheep, and fish. The Canadians preserve their provisions in the same way.

A precaution is necessary in thawing them; for this end, they should always be put into cold water first. Indeed, in the case of persons buried in the snow, recovery is much more likely to be brought about by plunging the individual into cold water, than by placing him in a warm bed.

This method of preserving food is not applicable to vegetables, but when these are frozen they should also be first put into cold water.

2nd. The abstraction of moisture by heat is employed in drying fish and other animal substances, as beef, bacon, &c., though in these the rapid tendency to putrefaction makes the employment of a certain quantity of salt, &c., necessary, along with the drying, unless the process be carried on with great rapidity, which may be effected by a high temperature and a free circulation of air. Hence in many places, where turf or wood is burnt, hams are hung within the wide kitchen chimney. Drying is also employed for the preservation of vegetable substances, such as grain, hay, &c. It is by this means that botanists preserve plants to form a hortus siccus, or herbarium, and many plants are thus preserved for medical use, but for this purpose a high temperature should never be applied, as it dissipates their active principles.

3rd. The exclusion of sources of oxygen gas constitutes another means of preventing or checking putrefaction; and as the atmospheric air is the most common source of oxygen, we shall limit our remarks to the means of excluding it. The effect of such exclusion is very great. Réaumur varnished some eggs, and found that at the end of two years they were yet capable of producing chickens; and Bomare mentions an instance where three eggs were inclosed within the walls of a church in the Milanese, and when found at the end of 300 years, they had not lost their flavour. Lime-water is the best medium in which to place eggs for long keeping. But more valuable articles than eggs are preserved by this means; and in a condition nearly equal to their fresh state. We allude to the method of perserving animal food and vegetables, promulgated by M. Appert. This consists in boiling the articles (if

meat, the bones must be first taken out) to nearly as great a degree as if intended for immediate consumption; they are then put into jars or tin canisters, which must be completely filled with a broth or jelly prepared from portions of the same meat. The jars are then corked and covered with a biting, and the canisters carefully soldered down. After this, they are placed in a boiler of cold water, to which heat is then applied till the water boils, and the boiling of which is continued for an hour; the fire must then be instantly extinguished, and the water soon drawn off, but the boiler must not be uncovered, or the bottles taken out, for one or two hours after. By this method meat has been kept sound and well-flavoured for six years and upwards, and has been sent to all parts of the globe. (Appert, 'Art of Preserving Animal and Vegetable Substances,' London, 1811.) The process of exhausting the air from the vessel which contains the substance to be preserved, and then effectually excluding the atmosphere, is a method now frequently used.

The natural methods of preserving organized substances are few and simple: the artificial more numerous, as well as more complex. They consist either in causing such changes in the elementary constitution of a body as shall form a new and less destructible article, or in introducing some additional principle which shall hinder the exercise of the natural tendency of the substance to decomposition.

The first set of means constitute the various kinds of fermentation, with respect to which we may remark, that the products of them are not only little disposed to undergo decomposition, but have also a powerful effect in preventing other substances from undergoing it; the most remarkable of these are acetic acid, or vinegar, and alcohol. The formation of sugar, another product of fermentation, is a powerful means of preserving fruits, in which it is formed spontaneously, or to which it is afterwards added. The addition of sugar is practised in forming syrups, jellies, and preserves.

Those parts of plants which contain much carbon last the longest. In trees cut down and exposed to air and moisture, the bark, which contains most carbon, endures after the rest has perished. The seed also contains much carbon, and when seeds are sent from India to England they are always wrapped in recently prepared charcoal. When stakes or piles of wood are to be driven into the beds of rivers or marshes, they are previously charred; and to preserve water sent to sea, the inner side of the cask is also charred.

There are many substances which when added to animal matter prevent for a longer or shorter time their decomposition, such as saltpetre (nitrate of potass), and common salt (chloride of sodium), which last is supposed to act by abstracting the elements of water; certain it is that meat is rendered by salting much drier, harder, less easily digested, and consequently less nourishing. [Antiscorbutics.] Many aromatic substances have a similar power of preventing putrefaction for a time. They were extensively employed in embalming in ancient as well as modern times, as the Egyptian mummies prove. Oils and resinous substances long resist putrefaction, and preserve other substances from it; bitumen, naphtha, and empyreumatic oils, are examples of this. Russia leather, which is dressed with the empyreumatic oil of the birch, not only does not become mouldy, but also preserves the books which are bound with it. The process of decomposition is greatly hastened by the agency of fungi, such as those which cause mouldiness, and the more formidable destroyers which occasion the dry-rot. The fungi which cause mouldiness are generally prevented from developing themselves by the presence of some aromatic oil; and the others which occasion the dry-rot in timber, may be prevented from developing themselves by the process invented by Mr. Kyan. [Dry-Rot; Timber, Preservation of.]

ANTISPASMODICS (from ἀντί, 'against,' and σπασμός, 'spasm'), the means of removing spasm. The state called spasm, or cramp, occurs only in muscular structures, and consists in an irregular and often excessive action of particular fibres of a muscle, of an entire muscle, or of several muscles. The muscles of an animal of the higher degrees of organization, such as man, are divided into two classes, the one set comprising those which are concerned in carrying on the functions most essential to life, viz. the circulation, respiration, and digestion, which act independently of the will, and are therefore called *involuntary* muscles; the other, which are organs of motion, and subject, in a certain degree, to the control of the will, are termed *voluntary* muscles. Each set act in consequence of the application to them of some stimulus; and their action is only uniform or natural when their appropriate stimuli are applied. The heart, for example, contracts from the stimulus of the blood; and the intestines are so constructed as to have proper motions excited in them by the food which we take, and the secretions which are mixed with it; which actions, in the healthy state, go on, not only without our willing it, but also without our consciousness. The stimulus to the other set is either a sensation felt in the part, and communicated to the chief nervous centres, viz. the spinal chord or brain, or a spontaneous effort of volition proceeding from the brain, and originating in some thought, and connected with some purpose or design, to be executed by the muscles thrown into action. Of the motion of such muscles we are always more or less conscious, and when the system is in its perfect or usual state of health we can repeat their action for a considerable length of time, and regulate its degree by repeated and distinct efforts of the will; as when a man walks, and quickens or slackens his pace according to his inclination. But a variety of circumstances influence the action both of voluntary and involuntary muscles, and render it irregular: when influenced by any of these, the action of the involuntary muscles becomes sensible and painful, and the voluntary muscles cease to be under the control of the will, and act not only without its stimulus, but often against its consent. These disordered actions

would appear to be owing to some improper stimulus, instead of the appropriate one, being applied to the organ or part affected. The derangement thus produced is called spasm, and the remedies used against it *antispasmodic*. They are of different kinds. Very few articles are, strictly speaking, merely antispasmodics, *i. e.* used solely to allay spasm, and incapable of being employed for any other purpose. On the contrary, this is only a particular application of substances capable of serving other and more general ends. Consequently, many of the so-called antispasmodics belong to other classes of medicines, such as the stimulants, particularly diffusible stimulants, as alcohol (brandy), sulphuric ether, camphor, &c., or to the narcotics, such as opium, belladonna, &c.; or to the tonics, such as metallic salts, viz. of iron, zinc, and silver; or vegetable bitters, as cinchona bark. The first set or stimulating antispasmodics act apparently by rousing the nervous energy of the system, and raising the neighbouring muscles to a level with the part in a state of spasmodic excitement. The second set act by rendering the nervous system torpid and insensible to every sensation, in large doses producing complete insensibility, even to the extent of coma and death. These two are administered when an attack is threatened or actually begun; the tonics are administered while the patient is free from an attack, and act by strengthening the system, so as to render it less susceptible of being acted upon by slight causes, particularly the irritating cause known or supposed to excite the paroxysm or fit. The substances which are more especially considered as antispasmodic are *volatile oils*, such as mint, lavender, &c., derived chiefly from the tribe of the *labiatæ;* or cajeput oil, from *myrtaceæ;* or dill, anise, fennel, &c., from the *umbelliferæ*, from which tribe also are derived the fœtid gums, as they are improperly termed, being gum-resins, such as assafœtida, galbanum, &c. These, with valerian and myrrh from the vegetable kingdom, and musk and castor from the animal kingdom, are the most valuable antispasmodics. All the volatile oils seem to act in the same way as the purely stimulating antispasmodics; while the fœtid gum-resins act by substituting new and powerful sensations instead of the morbid ones, and must be administered generally when the attack is threatened or begun.

These kinds of antispasmodics differ in value, not only as relates to their mode of action, but to their safety. The stimulating antispasmodics are only admissible when a fit is threatened, or may have begun; and as they greatly excite the vascular system, *i. e.* quicken the circulation, if upon their being given once they fail to remove the spasm, they should not be repeated. This caution is more especially necessary in respect to brandy, which is too commonly resorted to on every threatening or attack of spasm, such as cholic. So many of these diseases being connected with or disposed to end in inflammation, the free use of brandy or other stimulants is decidedly injurious. The external employment, in the form of embrocations, of the stimulating antispasmodics, is more allowable in cholic or hooping-cough; but here they act on a different principle, viz. that of counter-irritation. This is, in itself, a most valuable means of curing spasmodic diseases. An irritating application to the spine is of much service in hooping-cough: tartrate of antimony ointment or plaster applied to the tender spot which often exists in hysteria, and similar diseases, will be productive of more good than all the antispasmodic medicines which can be tried. Stammering, or other difficulties of speech, might be materially diminished by repeated irritating applications, as blisters, tartrate of antimony ointment, &c., to the nape and sides of the neck. Severe hiccup, continuing for several days and which resisted all internal remedies, has yielded to a blister applied along the side of the neck.

ANTISTHENES, the master of Diogenes, and commonly reputed the founder of the Cynic school. The time of his birth, as well as that of his death, is uncertain; but he was the contemporary of Socrates, Plato, Aristotle, and Xenophon. Diodorus Siculus mentions him as still alive in B.C. 366. He was born at Athens, of which his father, named also Antisthenes, was a citizen. He first attended the school of the Rhetorician Gorgias; but he afterwards became a follower of Socrates, and established a school of his own, in a place a short distance from Athens, called Cynosarges. The opinions of the Cynics are discussed under that head. We may here merely remark, that it is certainly a mistake to rank them as Ascetics. The invectives of Antisthenes, and especially of his follower Diógenes, appear to have been fiercely directed against the elegancies and ornamental superfluities of life; but by no means against such gratifications of the senses as could be obtained without much trouble or expense. The vice of these pleasures, according to their notion, lay not in the indulgence, but in the cost. Antisthenes seems to have been endowed with strong natural powers, but is said to have held all learning and mental cultivation in contempt, although his written works, as Diogenes Laertius tells us, extended to ten volumes (or perhaps treatises). They have all perished. From the list of their titles given by the biographer, they appear to have been mostly rhetorical. Laertius has enumerated many of the sayings of Antisthenes.

Cicero ('De Naturâ Deorum,' i. 13), has preserved a theological dogma of this philosopher, which has been often quoted to his honour—that the popular gods are many, but the God of nature is one. It has, however, been acutely remarked by Cudworth ('Intellectual System,' i. 4, 22), that by the expression *populares deos*, here, we are to understand, not the gods of popular superstition generally, but merely the different names given to the same supreme ruler of the universe by different cities and nations. Cudworth is of opinion that the philosopher had no design to take away all the inferior gods of the pagans, which, had he attempted, he would have been accounted an atheist, but only to point out the great truth, which indeed was acknowledged by all superior minds among the ancients (with some exceptions), that there was one God who was supreme over all

the rest, and that he was the same whom the Greeks worshipped as Zeus, the Latins as Jupiter, the Egyptians as Hammon, the Babylonians as Bel, &c.

The moral maxims of Antisthenes sound in general very lofty. He regarded all actions as being either virtuous or vicious, and virtue as the only thing worthy of desire or esteem. Before giving him credit, however, as the teacher of a pure and elevated system of ethics, on the strength of these imposing generalities, it would be necessary to know exactly what he meant by virtue. The fullest, and perhaps the fairest, picture we have of Antisthenes is given by Xenophon, who has introduced this philosopher as one of the speakers in his Sympósium, or 'Banquet,' and put into his mouth, among other things, a very striking discourse on the wealth of poverty. Altogether he is here represented in a very engaging light.

Antisthenes is said to have had few pupils, and to have treated them with great harshness. He has the credit of having set the example to his followers of wearing the beard long, and carrying the staff and satchel, or wallet, which afterwards became the distinguishing badges of the Cynics.

Two short orations, entitled 'Ajax' and 'Ulysses,' attributed to this philosopher, are printed in the 'Oratores Græci' of Henry Stephens and of Reiske. They are two puerile rhetorical declamations, and, if written by Antisthenes, which we may reasonably doubt, do him no credit.

ANTISTROPHE. [Strophe.]

ANTI-TAURUS. [Taurus.]

ANTI'THESIS, a Greek word (ἀντίθεσις) literally signifying 'opposition.' It is used in various senses by the Greek writers: sometimes it means merely 'objections,' or 'opposite arguments;' sometimes it is used to denote the contrasting of one set of circumstances with another; as, for instance, when a person, attempting to place the conduct of an adversary in the worst light, first states what the accused *ought* to have done, and then what he *has* done.

But the term antithesis is most commonly used to express contrast of ideas; and the term is equally applied whether the contrast is effected by single words, or by single clauses. (Quintilian, 'Inst. Orat.,' lib. ix. cap. iii.) This taste for antithesis shows itself very strongly in the Greek language, both in poets and prose writers, and more especially in some of the orators and rhetoricians; but it is generally and justly condemned by the Greek writers on style. Quintilian (ix. 3) expresses the Greek term ἀντίθετον (which is equivalent to ἀντίθεσις) by the Latin word *contrapositum*; and he remarks, that the antithesis does not always contain contrarieties or opposites. When antithesis is used sparingly and judiciously, it sometimes gives force to expression, and helps to fix distinctions in the memory; but its indiscriminate use tends to draw the mind from a true perception of the subject, and to fix it on the play of words more than on the real meaning.

ANTI-TRINITARIANS. [Arians; Unitarian.]

AN'TIUM, now *Porto d'Anzo*, on the coast of Latium, in the Campagna of Rome, once a city of the Volsci, and noted in Roman history as the place of refuge of Coriolanus. Antium, after having been often the enemy and at times the ally of Rome, was finally subjected by the Romans B.C. 337, and became a Roman colony. The people of Antium were given to piracy, but the Romans took their ships from them. Antium was a favourite place of retreat for the wealthy Romans in Cicero's time. Nero, who was born at Antium, excavated a port, and adorned the place with fine buildings. The numerous ruins which extend for three miles along the coast at Antium show the extent of the old Roman city. Pope Innocent XII. built the present small harbour. Porto d'Anzo now consists of a castle and a lighthouse which is on the new haven, and a few houses and huts. The harbour will not receive vessels of more than 120 tons burden. The charcoal which is made in the neighbouring forests is almost the only article of trade, which is carried off by large, country barks. Porto d'Anzo is 32 miles S. by E. of Rome. It stands near a promontory, and the coast is high and steep; but it sinks down to a flat shore as we advance south to the town of Nettuno, which is about two miles from Porto d'Anzo. Nettuno, though a small dirty place, is the most populous on this coast next to Cività Vecchia. The climate, even in summer, is tolerably good. (Westphal., *Die Römische Kampagne.*)

ANTIVARI, a town in Albania, in European Turkey, on the coast of the Adriatic, stands in 42° 4′ N. lat., 19° 9′ E. long. The town, which is also called Bar, has a population of 6000, and is the see of a Catholic archbishop. It was taken from the Venetians in 1573; and the inhabitants are now chiefly Mohammedans. They are for the most part seamen. Antivari forms the port of Skodré, the ancient Scutari. There is some trade in salt and oil, which are the chief manufactures of the place. (Balbi, *Géographie.*)

A'NTLIA PNEUMA'TICA, the 'Air-Pump,' a constellation in the southern hemisphere, named by Lacaille. It is bounded by Centaurus, Crater, Hydra, Pixis Nautica, and Argo.

ANTŒCI, from the Greek, signifies 'those who live over against each other,' and is applied to designate the inhabitants of two places which have the same longitudes and latitudes, only differing in one latitude being north and the other south. For example, Malta and the Cape of Good Hope are nearly Antœci. Two antœcial places have the same hour of day or night, but opposite seasons of the year.

ANTOINE DE BOURBON, Duke of Vendôme, married, in 1548, Jeanne d'Albret, only child of Henry II., king of Navarre. Henry, Prince of Béarn, afterwards Henry IV. of France, was the offspring of this marriage. Antoine assumed the title of king of Navarre in right of his wife. Antoine de Bourbon aspired to be at the head of the administration of France after the accession of the youthful king Francis II., but failed. When the civil and religious war broke

out in 1562, the king of Navarre commanded the king's troops, and received a wound at the siege of Rouen, of which he died in November of the same year. [BOURBON; HENRI IV.]

ANTOINETTE, MARIE. [MARIE ANTOINETTE.]

ANTONE'LLO DA MESSI'NA, a celebrated Italian painter, distinguished as the first Italian who painted *in oils*, as it is termed. He was born at Messina about the year 1414, and was instructed in painting by his father, Salvatore d'Antonio. About the year 1442 he had occasion to visit Naples, where he saw in the possession of the king, Alfonso I., a picture executed in a manner and with materials quite new to him: this was a picture of the Annunciation by Giovanni da Bruggia, as Vasari names John Van Eyck. Antonello no sooner saw this picture than he was possessed with an invincible desire to learn by what means it was painted; and having learnt the name and place of residence of the painter, he immediately set out for Flanders, where, by means of presents of Italian drawings and other works of the kind, he was not long in obtaining Van Eyck's secret. Antonello seems to have remained with Van Eyck until his death in 1445, when Antonello returned to Sicily for a few years; but before 1450 he was in Venice, by which time he had communicated the new method to Domenico Veneziano, who was murdered in Florence in 1464 by Andrea del Castagno, after he had obtained the secret of the new method from him. From Venice Antonello repaired to Milan, where he probably dwelt some years, and about the year 1470 he returned to and established himself at Venice. In Venice he lived upwards of twenty years in the enjoyment of the reputation of one of the most distinguished painters of his age. He died aged 79, probably in 1493, just as he was about to execute some works for the palace of the Signory of Venice.

Antonello appears to have made no secret of his new method of painting after his second visit to Venice. The method of painting simply *in oil* was very old, and that of Van Eyck was not merely painting in oil; it was, according to Vasari, painting *in varnish*. Vasari says that Van Eyck, by boiling linseed, poppy, and nut oils, with other mixtures, obtained that *varnish* which he, in common with every other painter in the world, had long desired. Antonello's works were distinguished for tone, for brilliancy of colour, and for the excellence of their impasto, but those which remain are much darkened. In design they are similar to the works of the Bellini.

ANTO'NIA MAJOR, the elder daughter of M. Antonius the triumvir, by Octavia, the half-sister of Augustus, born 39 B.C. She married L. Domitius the son of Cn. Domitius, who supported the interests of Antonius in the disputes with Augustus until a short period before the battle of Actium, and the grandson of L. Domitius, who fell in the flight from Pharsalia. Among the descendants of Antonia were some of the most illustrious personages in Rome. One of her daughters, Domitia Lepida, was the mother of Messalina, afterwards married to the emperor Claudius; and her son, Cn. Domitius, married Agrippina, and was the father of the emperor Nero. We have called this Antonia the *elder* in agreement with Suetonius and Plutarch. Tacitus speaks of her as the younger daughter (*Ann.* iv. 44; xii. 64).

ANTO'NIA MINOR, the sister of Antonia Major, was born B.C. 38 or 37. She married Drusus Nero, the brother of the emperor Tiberius, by whom she became the mother, 1, of Germanicus; 2, of Livia or Livilla, who was first married to Caius Cæsar, the grandson of Augustus, and after his death to her cousin Drusus, the son of Tiberius; and 3, of the emperor Claudius. Caligula, the son of Germanicus, was her grandson.

Antonia lost her husband B.C. 9, when she was about thirty years of age. Early in the reign of Tiberius, A.D. 19, she saw the widowed Agrippina return from the east with the ashes of her son Germanicus. In A.D. 23, her daughter Livia, corrupted by Sejanus, assisted in the murder of her own husband Drusus, but her guilt remained unknown until eight years after, when Antonia herself became indirectly the cause of the discovery. Sejanus was then preparing to execute his schemes for the destruction of Tiberius, and his intrigues became known to Antonia, who communicated information through the freedman Pallas to the emperor. The ruin of the favourite brought many past crimes to light, among others the murder of Drusus; and Livia met the fate which she deserved. Under the reign of her grandson Caligula, Antonia was at first highly honoured. But respect soon changed to coldness and ill-treatment; and at last her death was supposed to be hastened by his neglect, or brought about by more direct means. If we place her death in the first year of Caligula, she was about seventy-five years of age. Antonia was celebrated for her beauty, and still more for her chastity, in an age when that virtue was not common among women of her rank. A gold medal of Antonia, on which she has the title of Augusta, shows a profile of singular beauty.

ANTONIN, SAINT. [TARN-ET-GARONNE.]

ANTONINE COLUMN, a lofty pillar which stands in the middle of one of the principal squares of the city of Rome. It was raised by the senate in honour of the emperor Marcus Aurelius Antoninus, and in memory of his victory over the Marcomanni and other German tribes. The shaft of the pillar is 13 feet 1 inch in diameter at the bottom, and one foot less at the top; its height, including the pedestal and capital, is 136 feet, of which 13 are under ground; and the statue on the top and its pedestal are 27½ feet more, making the whole height 163½ feet. (Taylor and Cresy's 'Architectural Antiquities of Rome.') The pedestal of the Antonine column is disproportionate to the shaft. The capital is Doric. The shaft is made of twenty-eight blocks of white marble. A spiral staircase of 190 steps is cut through the interior of the marble, and leads to the gallery on the top, which is surrounded by a balustrade. The exterior of the shaft is covered with bassi-rilievi placed in a spiral line around, which represent the victories of Marcus Aurelius over the Marcomanni and other hostile nations. The style and

execution of these sculptures are inferior to those of the Trajan pillar, which the artists evidently purposed to imitate.

ANTONI'NUS PIUS, or, with his full name, according to Capitolinus, Titus Aurelius Fulvus Boionius Antoninus Pius, was the son of Aurelius Fulvus and Arria Fadilla. He was born September 19, A.D. 86, in the reign of Domitian, at Lanuvium, now Larigna, a town of Latium, a few miles south of the Alban Lake. His ancestors, on his father's side, were of Nemausus, now Nismes, in Languedoc. His youthful years were spent at Lorium, a town near the north outlet of the Tiber, under the care of his paternal and maternal grandfathers, T. Aurelius Fulvus, who had twice been consul, and Arrius Antoninus, who also had twice attained the same honour.

Antoninus inherited great wealth, and was speedily raised to the successive dignities of quæstor, prætor, and consul. But his taste was for a country life. When Hadrian entrusted the administration of Italy to four men of consular rank, he gave to Antoninus the government of that part in which his possessions lay. On his return to Rome, from acting as proconsul of Asia, he was often consulted by Hadrian on public matters; and he was adopted as the emperor's successor, on condition of adopting himself Marcus Antoninus, the son of his wife's brother, and Lucius Verus, the son of Ælius Verus, who had been adopted by Hadrian, but had died prematurely. He then became associated with the emperor in the government. On Hadrian's death, A.D. 138, he became emperor with the title of Antoninus Augustus, to which the name of Pius is added on his medals. The only history of this emperor's life, which is by Julius Capitolinus, is altogether deficient in precision and chronological arrangement. He seems never to have left Italy after his elevation, but his officers maintained the security of the provinces and protected the frontiers from aggression. In Britain, Lollius Urbicus confirmed the former conquests; the Moors of Africa were compelled to sue for peace; and the attempts at rebellion in Germany, Greece, Judæa, and Egypt, were checked by the vigour of his governors. The emperor died at Lorium in the seventy-fifth year of his age (seventieth, according to Capitolinus), B.C. 161, and was succeeded by Marcus Aurelius, commonly called Antoninus the Philosopher. Antoninus was buried in the tomb of Hadrian, one of the architectural monuments with which he adorned Rome.

Antoninus married Annia Faustina, the daughter of Annius Verus, by whom he had four children, one of whom, Faustina, became the wife of M. Aurelius. The conduct of Antoninus's wife gave occasion to scandal, but on her death, in the third year of his reign, the senate paid her the usual compliment of divine honours. Part of a temple erected to Antoninus and Faustina still exists in the Campo Vaccino at Rome. Antoninus also created an establishment for young females, who were called Faustinianæ, in honour of the deceased empress. The general character of the policy of Antoninus was beneficent and just, and the Roman world perhaps never had a more virtuous master. He continued the governors of provinces for many years in office when their conduct was satisfactory; and the provinces themselves enjoyed under his reign freedom from all exorbitant taxation. He surrounded himself with a council of chosen friends, without whose advice he took no public measure of any kind. In his elevated station the emperor maintained the simple character of his early life, mingling in the society of his friends like one of the same rank, and using his unlimited power more like a private citizen intrusted with it by his fellow-countrymen than as the undisputed master of the empire. The practice of giving pensions or allowances had grown up under preceding emperors, and had become a part of the imperial system of patronage. Antoninus continued it, and gave, as Capitolinus informs us, salaries and honorary distinctions to the professors of rhetoric and philosophy in all the provinces. Apollonius the Stoic was specially invited from Chalcis to superintend the education of M. Aurelius. The people and the soldiery participated in the bounty which the policy or generosity of the emperor distributed: he relieved distress in time of scarcity, and for their amusement filled the amphitheatre with animals from all countries. The elephant, the hyæna, and the antelope, with the crocodile, the unwieldy hippopotamus, and the tiger, were exhibited for the gratification of the people. On one occasion a hundred lions at once were let loose into the amphitheatre.

Under the reign of Antoninus, the lawyers Umidius Verus, Salvius Valens, Volusius Maecianus, Ulpius Marcellus, and Diabolenus, were employed by the emperor. One of the emperor's regulations of sanatory police forbade the burying of dead bodies in cities. His bounty was often employed in relieving human suffering. He embellished the imperial city with various edifices, and extended his liberality to remote cities of the empire. Antoninus was tall, and of a handsome person, as his biographer tells us, and his medals still show. His habits were abstemious and regular. He was honoured with the name of Divus (deified) at his death, and all the tokens of respect paid to the best emperors.

(*Life of Antoninus* by J. Capitolinus; Schlosser, *Universalhistorische Uebersicht*, vol. iii. pt. i.)

ANTONI'NUS, ITINERARY OF, one of the most valuable works, in a geographical point of view, which has descended to us from the ancients. It is merely what its name imports, an itinerary; but it extends over the whole Roman empire in its widest sense, embracing all the main roads in Italy and the provinces, in each of which the different stations are named with the intervening distances. There is also attached to the above a brief maritime itinerary of the distances from port to port. This work, with the Peutingerian Table and the Jerusalem Itinerary, is of great use in constructing the maps of the Roman and Grecian world. Though called by the name of Antoninus, the date of this work and the name of the author are uncertain. On a consideration of all the arguments adduced by Wesseling in the preface to his excellent edition of the work, there seems to us reason for thinking that some share in the authorship may

be ascribed to the three distinguished names, Julius Cæsar, M. Antonius, and Augustus, though such is not the opinion of Wesseling himself.

The roads of Britain could not have been all added to the Itinerary until the time of Septimius Severus, whose *vallum*, or great wall of protection against the Picts (erected A.D. 209), is more than once mentioned. The name Diocletianópolis (p. 330) carries us to a period between A.D. 285 and 305. Whatever may be the date of the Itinerary, it received additions to a late period.

As a specimen of the work, we quote a few lines which may be interesting to the reader of Horace's amusing journey to Brundisium. In this extract little regard is paid to the grammatical cases; but this is not an evidence of a very late age, for even before the time of Constantine it had become not uncommon to consider the names of places as indeclinable, and the case selected to serve for all was generally the accusative or ablative. The numbers within brackets mark a variation in the MSS., some of which admit of easy explanation, but the occurrence of these errors in the number of miles is the chief drawback from the value of the work. The road commences from Rome.

Aricia . . .	M. P. XVI.
Tribus tabernis	M. P. XVII.
Appi Foro . .	M. P. X. [XVIII.]
Tarracina . .	M. P. XVIII. [XXVIII.]
Fundis . . .	M. P. XIIII. [XVI.]
Formis . . .	M. P. XIII.
Minturnis . .	M. P. IX.
Sinuessa . .	M. P. IX. [XIIII.]
Capua . . .	M. P. XXVI.
Caudis . . .	M. P. XXI.
Benevento . .	M. P. XI.
Equo tutico .	M. P. XXI.
Eeas	M. P. XVIII.
Erdonias . .	M. P. XVIIII. [XVIII.]
Canusio . . .	M. P. XXVI.
Rubos . . .	M. P. XXIII.
Butuntus . .	M. P. XI.
Barium . . .	M. P. XII.
Turribus . .	M. P. XXI.
Egnatiae . .	M. P. XVI. [XXI.]
Speluncas . .	M. P. XX.
Brundisium .	M. P. XVIIII. [XXIII.]

ANTONINUS, WALL OF. This was an entrenchment raised by the Romans across the north of Britain under the direction of Lollius Urbicus, legate of Antoninus Pius, about A.D. 140, and is supposed to have connected a line of forts erected by Agricola, A.D. 80. Julius Capitolinus, the only ancient writer who mentions this rampart, calls it a turf wall (*murus cespititius*). The work was composed of a ditch, a rampart with its parapet, made of materials taken from the ditch, and a military way running along the whole line of the entrenchment at the distance of a few yards on the south side. It extended from Dunglass Castle on the Clyde to the heights above Caer Ridden Kirk, a little beyond the river Avon on the Frith of Forth, or probably to Blackness Castle two miles farther on, though it cannot now be traced so far. In its course are nineteen forts, the eighteen distances between which amount to 63,980 yards, or 36 English miles, and the mean distance from station to station is 3554 yards, or rather more than two English miles. In the position of the forts, the Romans chose a high and commanding situation from whence the country could be discovered to a considerable distance, contriving, as far as circumstances would permit, that a river, morass, or some difficult ground should form an obstruction to any approach from the front. Forts were also placed upon the passages of those rivers which crossed the general chain of communication. From inscriptions discovered in Scotland, it appears that the entrenchment was made by the second legion, by vexillations of the sixth and the twentieth legion, and the first cohort of the Tungri. A very considerable portion of the entrenchment may still be traced. The modern name is Grimes Dyke. (General Roy's *Military Antiquities of Britain*; Horsley's *Britannia*.)

ANTONI'NUS LIBERA'LIS, probably lived under the Antonines. He is the author of a work in Greek entitled a 'Collection of Metamorphoses.' This collection is borrowed from a variety of authors, and is curious for containing many passages of poets who are now lost. The best edition is that of H. Verheyk, Leyden, 1774. 8vo. (Bast, *Epistola Critica*.)

ANTO'NIO, one of the claimants to the throne of Portugal after the death of King Sebastian, was the natural son of the Infante Don Luiz, son of King Manuel. Antonio accompanied his cousin, King Sebastian, in his unfortunate expedition to Africa, and was there taken captive in 1578. He had the ability to conceal his real name and rank, and consequently had less difficulty in obtaining his deliverance. On his return to Lisbon he found his uncle, Cardinal Enrique, who had been appointed Regent by Sebastian, in possession of the throne. Antonio immediately claimed the crown, on the plea that his father had secretly married his mother. After several ineffectual attempts, in one of which he was assisted by an expedition from England, consisting of 120 vessels, with about 20,000 volunteers, under the command of Sir Francis Drake and Sir John Norris, he retired to France, where he ended his days in obscurity and indigence, on the 26th of August, 1595. (Lemos, *Historia General de Portugal*, vol. xvii.; Antonio de Herera, *Historia de Portugal*; Mariana, from the year 1578 to 1590.)

ANTONIO, NICOLAS or NICOLAO, a Spanish writer, born at Seville, in 1617. His most important work is 'Bibliotheca Hispana,' an account of Spanish writers from 1500 to 1664; Rome, 1672, 2 vols. folio, and Madrid, 1783, 2 vols. folio. For Spanish literature there is certainly neither a better nor a safer guide. Antonio died in 1684.

ANTONIO, MARC. [RAIMONDI.]

ANTONIO, ST. [CAPE VERD ISLANDS.]

ANTO'NIUS, MARCUS, the Orator, the son of C. Antonius, was born 142 B.C. In B.C. 99 he was the colleague of A. Postumius Albinus in the consulship; and in the following year he defended M. Aquilius on a charge of extortion during the servile war in Sicily. In 97 he was censor. He fell a victim to the fury of Marius and

Cinna, when they took forcible possession of Rome in B.C. 87. (Plutarch, 'Marius,' c. 44.) His eloquence is celebrated by Cicero in his 'Brutus,' chap. 37, 38.

ANTONIUS, MARCUS, eldest son of the Orator, and father of the Triumvir. He was prætor B.C. 75, and in the next year he was intrusted with the province of protecting all the coasts of the Mediterranean against the pirates. Crete was the chief scene of his operations, and though his partial successes gained him the honorary title of Creticus, the outrages and extortion of which he was guilty led at last to an insurrection in which he lost his life about B.C. 69.

ANTONIUS, CAIUS, surnamed Hybrida, another son of the Orator, was the colleague of Cicero in his consulship (B.C. 63). Under the orders of the senate he had to conduct the war against Catiline; but on the day of the battle he was prevented by illness from appearing on the field, and the command devolved upon his lieutenant, Petreius. In B.C. 61 he had, as proconsul, the province of Macedonia. Antonius gave out that Cicero had stipulated for the payment of a large sum of money, in return for Cicero's aid in getting him the province, a charge which Cicero's ambiguous language and conduct seem not to discountenance. Antonius was guilty of great extortion, and at the end of the first year Pompeius threatened a motion in the senate for his recall. Cicero, who avows in his private letters that he could not defend Antonius without injury to his own character, nevertheless exerted his eloquence most powerfully and successfully in his defence. Accordingly Antonius held the province for a second year; but on his return (B.C. 59) he was brought to trial on a charge of extortion, and of carrying on war out of his province without the authority of the state. Though again defended by Cicero, he was found guilty, and condemned to perpetual exile. He returned to Rome B.C. 47, and probably died B.C. 44.

ANTONIUS, MARCUS, the Triumvir, was the eldest son of M. Antonius Creticus, and Julia, sister of L. Julius Cæsar, the consul of B.C. 90. He was probably born in B.C. 83. His father died while he was yet young, and his mother Julia married P. Cornelius Lentulus Sura.

Antonius was an early friend of young Curio, and soon got deep in debt. Curio, being surety for the debt, prevailed upon his father to discharge it. Among the Roman nobles who were put to death by Cicero as accomplices of Catiline was P. Cornelius Lentulus Sura, then prætor. It was natural that Antonius should attach himself to Clodius, when that powerful tribune attempted to bring Cicero to punishment for his illegal proceedings in the matter of Catiline's conspiracy. Antonius now went over to Greece, where he diligently applied himself to oratory and military science. From thence he was invited to join Gabinius, who was proconsul of Syria. In B.C. 55 Gabinius undertook to restore Ptolemæus Aulétes to the throne of Egypt, and the credit of his success was chiefly due to Antonius. In B.C. 52 we find Antonius acting as one of Cæsar's lieutenants at the siege of Alesia in Gaul; and he was left by Cæsar at the end of that year at the capital of the Ædui in the command of the troops there quartered. The following year he was employed under Cæsar in extinguishing the last embers of the Gallic war; and through his interest and that of Curio he was elected B.C. 50 into the college of augurs.

Through the influence of the same powerful friends Antonius was elected a tribune for B.C. 49. The tribunes entered upon their office on the 10th of December, whereas the consular authority commenced upon the first day of the year. Antonius employed this interval in maintaining before the people the claims of Cæsar against the measures of Pompeius and the senate. When the kalends came, the senatorian party put to the vote the motion that Cæsar should disband all his troops by a given day, or be treated as a public enemy. Antonius and his colleague Cassius interposed their tribunitian *veto*, but on the 7th of January the decree was passed which suspended all the laws, and gave to the senatorian party irresponsible power over all the citizens. The tribunes, Antonius and Cassius, fled in disguise to Cæsar, whose army in a few weeks drove the authors of the late revolution from Italy. On the first expedition of Cæsar into Spain, B.C. 49, Antonius was left in the military command of Italy, which was again intrusted to him in the winter of the same year, when Cæsar crossed into Epirus. He distinguished himself by his able defence of Brundisium and its port against a Pompeian fleet under Libo, and soon after he crossed the Adriatic with reinforcements for Cæsar. At the battle of Pharsalia, B.C. 48, he commanded the left wing. In the following year, Cæsar, being appointed dictator, selected Antonius as his master of the horse, an appointment which again gave him the chief authority in the absence of the dictator. During this period he showed his firmness in checking the violent proceedings of Dolabella. But his conduct was marked by the most open acts of licentiousness. He made his appearance in public with an actress named Cythéris in a car drawn by lions. Antonius soon broke off his connexion with the Grecian actress, and married Fulvia, the widow of Clodius. During the second war in Spain (B.C. 45) against the sons of Pompeius, when Cicero was induced by some exaggerated accounts of their successes to meditate an escape from Italy, he was checked by the interference of Antonius, whose letter on the occasion still exists. The next year Antonius was the colleague of Cæsar in the consulship.

Some of the conspirators against Cæsar thought of gaining Antonius to their purpose, but as he was not likely to join, it was proposed to make him also a victim, but this was prevented by M. Brutus; and it was finally determined to engage him in conversation outside of the senate-house while the assassination of Cæsar was committed within (B.C. 44).

After the assassination of Cæsar, Antonius, who was consul, amused the conspirators for a time with the most conciliatory conduct, but he inflamed the people by his speech over Cæsar's body, and his dexterous management of the circumstances

His real power lay in the detestation in which the senatorian oligarchy was held. The conspirators were soon afraid to appear in Rome. Antonius, who may perhaps have aspired to the late dictator's power, soon found a powerful opponent in young Octavius (afterwards Augustus), the great-nephew and adopted son of the late dictator, who appears to have attempted to remove Antonius by assassination. Antonius left Rome in October to meet at Brundisium four of the veteran legions from Greece; but Octavius, or, as he now called himself, Cæsar, found other veterans in the colonies of Campania ready to support him; and two of the four legions from Greece suddenly passed over to him from Antonius. Before the end of the year, hostilities commenced in the north of Italy, where Antonius besieged Decimus Brutus in Mutina. On the 14th of April, B.C. 43, the first battle was fought, when Antonius, after defeating Pansa, was himself the same evening defeated by Hirtius. A few days after, he was again defeated by Hirtius and Cæsar on the one side, and D. Brutus on the other, and compelled to cross the Alps.

The two consuls fell in this contest, and Decimus Brutus, though relieved from the siege, was unable to pursue Antonius. Cæsar, never sincere in the cause of the senate, and himself supported by the senate only for their own purposes, at last threw off the mask. Ventidius had joined Antonius with three legions; the troops of Lepidus also declared for him; and Planeus on the Isara and Pollio in Spain declared themselves in favour of the more powerful party. Antonius now recrossed the Alps at the head of seventeen legions. In the meanwhile Cæsar had put an end to the equivocal conduct of the senate by marching upon Rome, and getting himself declared consul.

In the autumn of B.C. 43, the triumvirate of Antonius, Lepidus, and Cæsar was established. The triumvirate began by proscribing their enemies, among whom Cicero was not forgotten. In the division of power Antonius received Gallia Citerior and Ulterior, with the exception of Gallia Narbonensis. He and Cæsar conducted the war against Brutus and Cassius, who were defeated in the neighbourhood of Philippi in Macedonia, B.C. 42, but the victory was mainly due to Antonius. After making some stay in Athens, Antonius crossed into Asia, and at Tarsus he met with Cleopatra. He had summoned her to answer some accusations brought against her of assisting Cassius in the late war; and the queen, in obedience to the command, appeared in her gorgeous barge upon the Cydnus attired as the goddess Venus. Antonius was led captive by her to Alexandria, where he indulged in his voluptuous revels, till he was roused (B.C. 41) by a Parthian invasion on the one side, and a war in Italy on the other; but the Parthian war was postponed in order to oppose Cæsar in Italy, who was engaged in hostilities with Lucius Antonius, the brother of Marcus. The death of Fulvia, who, with Lucius, had been the chief cause of the war, led to a reconciliation between Antonius and Cæsar, B.C. 40; and Antonius married Cæsar's sister, Octavia. A new division of the empire was made, in which Antonius received all the provinces east of the Adriatic.

In B.C. 39 Antonius proceeded with Octavia to Greece, where he heard that his lieutenant Ventidius had defeated the Parthians. Ventidius gained another victory over the Parthian Pácorus in Syria, B.C. 38; and Antonius, though entitled to a triumph for the victory of his lieutenant, sent him to Rome to enjoy the honour.

In B.C. 37 Antonius was again called to Italy by the suspicious conduct of Cæsar. On his approach to Brundisium he was refused admittance into the harbour, and after some hostile demonstration a second reconciliation was effected by the mediation of Octavia, and Julia, the mother of Antonius. The triumviral power was renewed for a second period of five years. Cæsar now conducted the war against Sextus Pompeius, while Antonius directed his arms against the Parthians. On his approach to Syria he sent for Cleopatra, on whom he conferred the provinces of Phœnicia, Cœlesyria, Cyprus, and part of Cilicia, Judæa, and Arabia. His preparations for the invasion of the Parthian empire were on the largest scale, but the campaign was unsuccessful, and a retreat was effected with great loss.

In B.C. 35, when Octavia was bringing him money and recruits, Antonius sent her orders to remain at Athens, while he added to the insult by still dallying with Cleopatra at Alexandria. The following year he invaded Armenia, and got the king Artavasdes in his power, who had treacherously deserted him in his Parthian campaign. In the mean time, Cæsar, by the overthrow of Sextus Pompeius and the usurpation of the provinces assigned to Lepidus, was at last prepared for a contest with Antonius himself, who afforded him more than a pretext by the neglect of his sister and his conduct at Alexandria. In B.C. 33, Antonius again commenced an invasion of Parthia, but as soon as he had reached the Araxes, he retraced his steps to prepare for the war that threatened him from the west. Still a second year was passed in preparations; and in B.C. 31, the possession of the Roman world was decided by the victory off Actium. In August, 30 B.C., Cæsar appeared with a fleet and army before Alexandria, to which Antonius had retreated; and the desertion of his fleet and of his cavalry before his eyes left him only the hope of sustaining a siege. A false report of the death of Cleopatra completed his despair, and he killed himself with his own sword. Cleopatra likewise saved herself by suicide from adorning the triumph of the conqueror.

Antonius was four times married, or indeed five, if we may admit his marriage with Fadia, on the authority of Cicero. Of his two children by Fulvia, Antyllus the older was put to death; and the younger, Iulus Antonius, suffered for his intimacy with Julia, the daughter of Augustus. By Octavia he had at least two daughters; and by Cleopatra, a daughter of the same name, and two sons, Alexander and Ptolemæus Philadelphus. Of these, the daughter married the learned African prince Juba.

(Cicero's *Letters and Orations;* Plutarch's *Life of Antonius;* Dion Cassius; Appian, *Civil War;* Clinton's *Fasti.*)

ANTONIUS MUSA. [MUSA.]

ANTRIM, a county of Ireland, in the province of Ulster, is bounded on the N. by the Atlantic Ocean, E. by the North Channel, S.E. by Belfast Lough, S. by the county of Down, S.W. by Lough Neagh, and W. by the county of Londonderry. The county extends from N. to S. 56 miles, and from E. to W. 30 miles. The most northern point is Bengore Head, 55° 15′ N. lat., and the most eastern is Black Head, 5° 42′ W. long. The total area of the county is 1,164 square miles, or 745,177 acres, of which 503,288 are arable, 176,335 uncultivated, 10,358 plantations, 1908 towns, and 53,288 water.

The western extremity of the coast is at Port Rush, N. by W. of which lies the small group of islands called the Skerries, and a few miles farther E. the Giant's Causeway, an immense pile of perpendicular basaltic columns. [GIANTS' CAUSEWAY.] Other masses of columnar basalt appear on the north coast, at Bengore Head, at Fairhead, and elsewhere. The coast from Port Rush to Fairhead is nearly W. and E.; it then turns round, and runs nearly S.S.E., presenting a succession of precipitous cliffs, broken by a few bays and creeks, especially by the bay called Lough Larne, till it reaches the entrance of Belfast Lough, when it turns inward, and runs S.W. to Belfast. The island of Rathlin, of which the nearest point is about three miles from the north coast, contains 3,398 acres and more than 1000 inhabitants, who are chiefly employed in fishing and farming. The highest summit, Kenramer, is 449 feet above the sea. The greater part of the surface is rocky, and affords some pasture; the valleys and more sheltered places are fertile, and yield good crops. Island Magee is the peninsula which, extending about 8 miles northwards, and being rather more than a mile in width, forms the bay called Lough Larne. The peninsula is a bleak but fertile tract.

The eastern side of Antrim is mountainous; but the mountains form irregular groups rather than a continuous chain, and are intermixed with bogs, which also prevail in the western and flatter part of the country. The highest mountains are —Trostan, 603 yards above the sea, Knocklayd 562 yards, Agnew 520 yards, and Slemish 479 yards.

The most important river is the Bann, which separates Antrim from Londonderry on the west. [BANN.] The Main, after a course southwards of about thirty miles, falls into Lough Neagh. The Bush, after a course of about twenty miles, first westward and then northward, falls into the sea at Ballintrae. The Lagan rises in the county of Down, and after a course of about forty miles, falls into Belfast Lough, having, during a part of its course, separated the county of Antrim from that of Down. The Lagan Canal connects Lough Neagh with Belfast Lough.

The subsoil is basalt or trap, slate-clay, and limestone. The number of farms above one acre each was 24,072 in 1841. The average rent of land is 15*s.* per acre. Potatoes, oats, barley, flax, and some wheat, are grown. The quantity of flax grown was formerly considerable, but has diminished. The bogs are large and numerous. The fishery districts are Ballycastle and Carrickfergus, which in 1844 had 739 registered fishing vessels, and employed 2384 men and boys. The principal manufacture of the county is that of linen. The greatest part of the manufacturing population is employed in the spinning of linen and cotton yarn, and in linen and cotton weaving.

A coal-mine was opened at Ballycastle, but the coal was found to be inferior, the seams thin, and the works were relinquished. Fossil-wood, or wood-coal, occurs at Killymorris, near Ballintoy, on the same coast. Gypsum, marble, and beautiful crystal pebbles are found.

Antrim is divided into 14 baronies:—Lower Antrim, Upper Antrim, Lower Belfast, Upper Belfast, Cary, Lower Dunluce, Upper Dunluce, Lower Glenarm, Upper Glenarm, Kilconway, Lower Massereene, Upper Massereene, Lower Toome, Upper Toome. The county of Antrim is in the diocese of Connor.

Antrim returns 6 members to parliament:—2 for the county, constituency 6280; 2 for Belfast, constituency 7527; 1 for Carrickfergus, and 1 for Lisburn.

The entire population of the county in 1841 was 354,178, of whom 256,352 were in the rural district, and 97,826 in the civic district (including Belfast and Carrickfergus, given separately in the Population Returns).

The following are the principal towns:

Belfast, including Ballymacarett, a suburb in the county of Down, with 6697 inhabitants, total population 75,308. [BELFAST.]

Antrim, situated on the north bank of the Six-Mile Water, near the N.E. corner of Lough Neagh, is about 15 miles N.W. from Belfast, 54° 43′ N. lat., 6° 14′ W. long. It consists principally of two good streets, and has some trade in bleaching, paper-making, stocking-making, and the weaving of linen and calico. The parish church is a modern gothic structure; there are also two meeting-houses for Presbyterians and two for Methodists. The population, including Massereene, in 1841, was 2645. Near Antrim is one of the most perfect of the ancient round towers of Ireland, 95 feet high.

Ballymena is situated near the centre of a plain, on the Braid rivulet, which unites with the Main two miles below the town; it is about 9 miles N. by W. from Antrim, 54° 53′ N. lat., 6° 17′ W. long. It is a thriving and generally well-built town, with numerous bleaching-greens in the vicinity. The population, including the suburb of Harryville, in 1841, was 5549.

Ballymoney, a less important town than Ballymena, is situated near the north bank of a stream which falls into the Bann about 3 miles W. from Ballymoney. It is irregularly built, but is a flourishing place, with a church, meeting-houses, town-hall, and union workhouse. The population in 1841 was 2490.

Carrickfergus, the county town of Antrim, is a county of itself, which comprises an area of 26 square miles, or 16,700 acres, of which 12,483 are arable, 4088 uncultivated, (including Lough Morne, a lake of about 90 acres), and 129 in the town. The surface is hilly. The population of the county in 1841 was 9379, of which 5494

were in the rural district, and 3885 in the civic district.

The town of Carrickfergus is situated on the north shore of Carrickfergus Bay, or Belfast Lough, 9 miles N.N.E. from Belfast, and 111 miles N. from Dublin, 54° 43′ N. lat., 5° 49′ W. long. It was formerly a place of great strength, and was frequently besieged. Some traces of its fortifications remain, and its castle, built on a rock which projects into the sea, is kept up as an arsenal, and is mounted with heavy guns. The public buildings are—the town hall, parish church, Roman Catholic chapel, meeting-houses of Dissenters, market-house, court-house, and prison for the county of Antrim. The corporation was dissolved by the Municipal Reform Act, and Municipal Commissioners appointed, in whom the corporate property is vested. It is a parliamentary borough, and returns one member, constituency 1066. The assizes for the county of Antrim are held at Carrickfergus. The population of the town in 1841 was 3885. It has considerable trade, and its extensive fisheries had, in 1844, 330 registered vessels, which employed 976 men and boys. The landing-pier has been improved of late; vessels of 100 tons can now discharge at it.

Larne is beautifully situated at the entrance to Lough Larne, about half a mile from the shore. It has a good natural harbour for small vessels, where great numbers from Scotland anchor while waiting for their cargoes of lime from the extensive adjoining works of Magheramorne. The streets are generally narrow. The trade is small. The population in 1841 was 3545.

Lisburn is situated on the river Lagan, 92 miles N. from Dublin, and 9 miles S.W. from Belfast, 54° 31′ N. lat., 6° 4′ W. long. The Lagan canal and the railroad from Belfast to Armagh pass near it. The town has considerable trade in the various branches of linen manufacture, and there are extensive bleaching grounds in the neighbourhood. It has also a large general retail trade. There is a parish church, a chapel of ease, a Roman Catholic chapel, five or six meeting-houses of Dissenters, a court-house, market-house, linen-hall, and union workhouse. The town is pleasantly situated on a gently rising ground. The population in 1841 was 6284, of whom 477 are in the county of Down. Lisburn is a parliamentary borough, and returns one member, constituency 331.

(Fraser's *Hand-Book for Ireland;* Thom's *Irish Almanac for* 1846; *Population Returns for Ireland.*)

ANTRIM, Town. [ANTRIM, County.]

ANTRIMOLITE, one of the *Zoolite* class of minerals; occurring in amygdaloidal rock. It is of a chalky white colour, and of a fibrous silky texture. Like others of its class, it consists chiefly of alumina and silica.

ANTWERP, one of the nine provinces of the kingdom of Belgium, is bounded N. by the Dutch province of North Brabant, E. by Limbourg, S. by South Brabant, and W. by East Flanders and Zeeland. Its length from N. to S. is about 35 miles, from E. to W. 40 miles. The area of the province is estimated at 1049 square miles: the population by the census taken in October, 1846, was 406,358, which gives an average of 387.27 to the square mile. The population of the province in 1831, 1835, 1840, and 1846, stands thus in the government returns:

1831.	1835.	1840.	1846.
349,962.	356,893.	371,157.	406,358.

This table shows an increase of 13.8 per cent. between 1835 and 1846.

The province of Antwerp is flat, fertile, and highly cultivated. The soil, which is generally alluvial, yields in perfection all the crops common to England and the north of France. The district called the 'polders' extends along the Schelde, from the neighbourhood of Antwerp to Zantvliet; it was originally a marsh which was flooded by every tide, its surface being lower than the level of the river at high water. Dykes having been built to keep off the tide, the surface of the marsh was drained by means of water-wheels turned by windmills, and what was before an unhealthy swamp was changed into the richest pasture and arable land. There are some barren heaths in the north and north-east of the province. The province is well wooded, especially towards the south. The inclosures made by ditches, dykes, and trees, are kept in good order: some live hedges are found, but they are reckoned injurious. Good crops of wheat, rape, and carrots line the road all the way between Antwerp and Mechlin. Many fields of broom may be observed along this road: the stems of the broom after three years' growth furnish fuel for the kitchen or the oven, and are also used in burning bricks; the ground also is found to be in very excellent condition after the broom is cut down, and secures the farmer a heavy crop. The houses are strong, built of brick or stone, and generally thatched with straw: the roads are paved with broken stones. The principal rivers are the SCHELDE and its feeders—the Rupel, the Greater Nèthe, the Less Nèthe, and the Dyle. By means of these rivers, all of which are navigable, and by its numerous canals and railroads, the province has excellent means of communication, not only with every part of Belgium, but with France, Prussia, and the interior of Germany. There were seventeen manufacturing steam engines in the province in 1839.

The chief towns are—ANTWERP: MECHELEN (Mechlin): Boom, which stands about 10 miles S. of Antwerp on the Rupel, which is here joined by the canal to Brussels; great numbers of bricks and tiles are made here, and vessels for river and canal navigation are built; there are several tanneries, distilleries, breweries, salt-refineries and rope-walks in the town; population 7000: Gheel, which is situated on the Greater Nèthe 25 miles E. of Antwerp; the inhabitants of this town have been long famous for the humane care they take of the insane, who are sent here from different parts of the country; the town contains four churches, one of which is of great antiquity, seven chapels, and a town-hall; population 7100: Lierre or Lier, at the junction of the Greater and Less Nèthe, population 13,149; there are establishments for calico printing and for the manufacture

of linen and woollen stuffs, cotton yarn, and lace; besides these there are several breweries, distilleries, and oil-mills in the town; rape is grown in large quantities in the neighbourhood; there are eight churches, an hospital and a Beguinage in the town: Turnhout, about 25 miles N.E. of Antwerp; population 13,447; the town, which is well built, has manufactures of linen, lace, thread, ticks, checks, and calico, and establishments for bleaching linen, cotton-yarn, and wax; there are also several brandy distilleries in the town: Lillo, a small town with a population of 1000, but important on account of its fort, which commands the navigation of the Schelde: and Herenthals, 20 miles E. of Antwerp on the Less Nèthe; a canal which admits vessels of 70 tons joins the town to Antwerp; there are manufactures of cloth and leather; population 3500.

The province of Antwerp is in the see of the Archbishop of Mechlin, and sends four senators and nine representatives to the legislative chambers at Brussels. By the marriage of Mary of Burgundy to the Archduke Maximilian, this province fell to the house of Austria, in whose hands it remained till the French revolution, when it was formed into the department of Deux-Nèthes: in 1814 it became part of the kingdom of the Netherlands, and in 1830 a province of the new kingdom of Belgium.

(Macgregor's *Statistics;* Murray's *Handbook for N. Germany.*)

ANTWERP, the principal seaport of Belgium, is called by the natives Antwerpen, by the Spaniards Amberes, and by the French Anvers; it is situated on the right bank of the Schelde, where the river makes a considerable bend, in 51° 14′ N. lat., and 4° 24′ E. long. This port, with its spacious dock, basin, and quays, and its safe anchorage, is one of the best in Europe, although the navigation from the sea is somewhat tedious. It has sufficient depth for the largest vessels, and every convenience for ship-building. It is 28½ miles by railroad N. from Brussels, and 45 miles from the mouth of the Schelde. The breadth of the river opposite to the city is about 440 yards, and the rise of the tide is 12 feet. For two miles in front of Antwerp the depth at low water is from 32 to 42 feet.

Antwerp is a strongly fortified city on the land side, and has, in addition, a large citadel on the south, built by the Duke of Alba in 1568. No city of Belgium presents grander streets; the principal street, the Place de Meir, will bear comparison with any street in Europe. The gothic cathedral is one of the largest buildings in the Low Countries; it is 500 feet long, 250 wide, and has a spire 366 feet high. The interior is adorned with several of the finest pictures of Rubens, who was a native of Antwerp, and to whom a statue has been erected in the Place Verte. The Hôtel de Ville, or Town Hall, is a large and handsome building, with a front of about 260 feet; and the Bourse, or Exchange, is the model on which those of London (the late) and Amsterdam were built. The church of St. Jacques, which contains the tomb of Rubens, the church of St. Michael, the Oosterlings, which was originally the factory of the Hanseatic League, the palace built by Napoleon in the Place de Meir, St. Paul's, and St. Andrew's churches, and the churches of the Augustins are also fine edifices, and are decorated with the masterpieces of Flemish art. The new quay and the great basin of Antwerp were begun by Bonaparte, and were part of the plan by which he intended to make this city a great naval station. The area of the great basin is 17 acres, and of the small one 7 acres. On each side of the great basin are two careening docks, made during the empire of Napoleon for repairing the ships of war constructed here. The new custom-house is at the head of the great basin. The citadel is a regular pentagon, surrounded by a wet ditch 90 feet broad: it has five bastions, each containing a casemate capable of holding 400 men.

Antwerp is the principal seat of the silk manufactures of Belgium, and is especially famous for its black silks and velvets. It has large manufactures of cotton, linen, lace, carpets, hats, cutlery, and surgical instruments; there is also a bleaching establishment which is worked by steam, several sugar refineries, and other establishments common in large towns. It contains a great military arsenal, dockyards, and an extensive rope-walk.

The commerce of Antwerp is considerable, though far below what it was in the 15th and 16th centuries, when it is said to have had a population of 200,000, and that 2000 vessels annually entered its port. Its population in 1831 was 77,199, in 1836, 75,363; and in 1843, 79,000; 995 ships entered its port in 1829; 690 in 1830; and 382 in 1831. The shipping and trade of Antwerp in 1838 and 1839 stood as follows:—

		Ships.	Tonnage.
1838.	Entered . . .	1538	258,203
	Cleared . . .	1445	144,164
1839.	Entered . . .	1182	202,038
	Cleared . . .	1131	191,889

The value of imports and exports for these two years was—

	Imports.	Exports.
1838.	£4,555,628	£1,311,756
1839.	3,918,408	1,425,440

Antwerp has also, by means of canals and railroads, a large transit trade, the value of which in 1839 was 607,620*l.*; of this goods to the amount of 87,572*l.* were re-exported. The imports consist principally of coffee, sugar, and other colonial products, cotton stuffs, and other manufactured goods, corn, raw cotton, leather, timber, tobacco, wool, dyestuffs, salt, wines, fruits, &c. The exports consist chiefly of flax, cotton and linen manufactures, refined sugar, glass, zinc, oak-bark, grain and seeds, lace, &c. The French system of money, weights, and measures, is used in

Antwerp. A commercial joint-stock bank was established in 1837, and transacts all sorts of banking business. There are several offices for insurance of life, against fire, &c.

Antwerp, in the eleventh century, was a small republic. The industry of its inhabitants, joined to its favourable situation, raised it to the rank of the first commercial city of Europe during the reign of Charles V. Previously to its capture by the Spaniards under the Duke of Parma in 1585, Antwerp was one of the first cities in Europe; but it suffered much by that event. By the peace of Westphalia in 1648, the navigation of the Schelde was closed, and this, added to other calamities, destroyed the prosperity of the city. The navigation of the Schelde was opened at the time of the French occupation of Antwerp in 1792. In 1793 the French evacuated the town, but took it again in 1794, and held it till 1814, when it was surrendered to the allies after the treaty of Paris by Carnot, who had defended it up to this time. After the revolution of 1830 the king of Holland refused to evacuate the citadel of Antwerp in accordance with the terms agreed on for the separation of Holland and Belgium. In consequence of this, the French entered Belgium with a large army, and commenced the bombardment of the citadel of Antwerp, Nov. 29, 1832. The citadel, which was bravely defended by General Chassé with 4500 men, surrendered on the 24th of December.

(Macgregor's *Statistics;* M'Culloch's *Dictionary;* Murray's *Handbook for N. Germany.*)

ANU'BIS, an Egyptian deity, represented with the head of a fox, dog, or jackal, and a human body. In some Egyptian remains we observe him standing by a bier, on which a mummy is lying. Anubis was the son of Osiris and Nephthys, the wife of Typhon, and sister of Osiris. He appears to have been considered in one sense as the conductor and guardian of departed souls, and in this respect his functions bear some resemblance to those of Hermes of the Greeks, and Mercurius of the Romans.

ANVILLE, JEAN BAPTISTE BOURGUIGNON D', was born at Paris in 1697. From his boyhood he showed a strong bias for geographical studies. While at college he began without assistance to draw maps of the countries mentioned in the Latin classics which he was then studying. For this pursuit he sometimes neglected his regular tasks. Ancient geography continued ever after to be his favourite study. At the age of twenty-two he was appointed one of the king's geographers. He was employed by the Jesuits to make an atlas of China for the edition of Duhalde's History of that empire. This Atlas ('Nouvel Atlas de la Chine,' &c.) was published at the Hague in 1737. But the work that established his reputation was his map of Italy, which he published in 1743. He constructed this map chiefly upon a close investigation of the ancient writers, and of the Roman itineraries; and he corrected many gross errors of his predecessors. In 1744 D'Anville published his 'Geographical Analysis of Italy,' in illustration of his map. A full catalogue of D'Anville's maps and works is given by Barbié du Bocage in his 'Notice des Ouvrages de M. D'Anville, précédée de son Eloge par M. Dacier,' Paris, 1802. He published one hundred and four maps on ancient, and one hundred and six on modern geography. He wrote about forty works, including several memoirs, which are inserted in the 'Recueil de l'Académie des Inscriptions et Belles Lettres.'

In order to form a just estimate of the merit of D'Anville, we ought to bear in mind that in his time geographical information was much more scanty than at present; that comparatively few points of the earth had been determined by astronomical observations; that the surveys of coasts were very imperfect; and that he had few guides whom he could trust. D'Anville himself had never travelled beyond a hundred miles from Paris; but he made up in a great measure for these disadvantages by his indefatigable researches in the authors of antiquity, as well as of the middle ages, who could afford any information on geographical matters, and by a rare sagacity and judgment in eliciting truth out of conflicting statements and opinions. He was greatly assisted by his wonderful memory.

It is remarked by the biographer of D'Anville ('Biog. Universelle—D'Anville'), that his style is not good, and that, owing to this and other causes, there is often a want of method and clearness in his dissertations. We believe that D'Anville was occasionally more indebted to previous geographers than is generally supposed; in saying this, we do not mean to detract from his real merit, which will stand the test of the most rigorous examination. In 1773 the French Academy of Sciences elected him, then seventy-six years of age, into their body, and the same year he succeeded to the vacant place of first geographer to the king. In 1777 he published his 'Considérations sur l'Etude et les Connoissances que demande la Composition des Ouvrages Géographiques,' a sort of legacy for those who should follow him in the same career. In 1779 Louis XVI. purchased his valuable collection of maps, which he had collected in the course of sixty years devoted to science. D'Anville in his old age fell into a state of physical and mental imbecility, from which death relieved him in 1782, at the age of eighty-five. His wife, with whom he had passed fifty-one years of his life, died the year before, without his being sensible of her loss. He left two daughters.

ANWARI, or ENWERI, properly AWHAD-ED-DIN ANWARI, a celebrated Persian poet, who flourished in the twelfth century of our æra. He received his education in the College of Mansur, at Tus. A visit of the Seljukide sultan Sanjar to Tus furnished him the first opportunity of making himself known, by a poem in praise of the sultan, which is by oriental critics considered one of his best productions. Sanjar, who was fond of poetry, enlisted him among his suite, and bestowed honours and ample rewards upon him. Anwari followed the sultan to Meru, then the residence of the Seljukides. Here the poet devoted himself to astrology, but was not fortunate in his predictions, by one of which he made himself so ridiculous that he retired from Meru to Balkh, where he died in the year 597 of the

Hegira (A.D. 1200-1201). Manuscript copies of the 'Diwan,' or Collection of Poems of Anwari, are not unfrequently met with. The language of Anwari, though he is one of the earlier Persian poets, is as full of Arabic expressions as that of almost any subsequent writer; whereas, in the 'Shah Nameh' of Firdusi, who lived only little more than a hundred and fifty years before Anwari, we find the Persian in a state of unadulterated purity. It is conjectured that Firdusi, to preserve the national character of his poem on ancient Persian history, studiously avoided all Arabic expressions which might, at his time, have crept into the Persian language.

ANWEILER, a canton and town in the circle of the Rhine, in the kingdom of Bavaria. The town is built on the Queich, and has 2600 inhabitants, who are chiefly engaged in the cultivation of the vine and in manufacturing paper and leather. The ruins of the castle of Triefels, where Richard Cœur-de-Lion was kept a prisoner in the year 1193, may be seen in the vicinity of this place.

ANXUR. [TERRACINA.]

A'NYTUS. [SOCRATES.]

ANZIN, a village of 4000 inhabitants in the neighbourhood of Valenciennes, in the department of Nord, is the seat of the most extensive collieries in France. The pits amount to forty altogether, some of which are more than 1400 feet deep. The coal burns fiercely, and is in demand for purposes which require an intense flame; to this circumstance perhaps may be ascribed the establishment of glass-works and manufactories at Anzin. The number of persons employed in the mines amounts to 16,000, and the annual produce is about 200,000 tons.

ANZUAN. [COMORO ISLANDS.]

AO'RTA, a Greek word, *ἀορτή*. The aorta is the great vessel from which all the arteries of the body which carry red blood derive their origin. It arises from the upper and back part of the left ventricle of the heart. Its origin is directly opposite the lower margin of the cartilage of the third rib on the right side of the chest. From this point it ascends behind the pulmonary artery, still inclining a little to the right side of the chest. It continues to ascend as far as the top of the second vertebra of the back. All this part of the vessel is called the *aorta ascendens*. When it reaches as high as the lower margin of the first rib, it bends obliquely backwards towards the body of the third vertebra of the back. This part of the vessel is called the curvature, or the transverse arch of the aorta. From the third vertebra of the back, where its arch terminates, it proceeds in a straight course downwards through the chest, immediately in front of the spinal column, and towards the left side of it. Through an opening formed for it in the diaphragm [DIAPHRAGM] it passes from the chest into the abdomen.

AOSTA, a province of the continental states of the King of Sardinia, is bounded N. by the Pennine Alps, W. by the Graian Alps, S. by an offset from these, which separates it from the province of Ivrea, and E. by a spur from Mont Rosa, which separates it from Val Sesia. The greatest length of the province from E. to W. is 55 miles, and its greatest breadth 30 miles. About one-half the surface is covered with barren mountains and glaciers. The remainder consists of valleys, the largest of which, the Val d'Aosta, runs in a direction generally from W. to S.E.; from this a great number of smaller valleys branch out in all directions. The Val d'Aosta, which takes its name from the city of Aosta, is watered by the Dora Baltea, an affluent of the Po. The great range on the north contains the peaks of Mont Rosa, Mont Cervin, and Mauvoisin; in the north-western angle of the province stands Mont Blanc, and on the west are the passes of the Little St. Bernard. These, together with the numerous glaciers which are skirted by several of the valleys leading to the N. and W., have very great attractions for the naturalist and the tourist, while the valleys themselves are doubly charming from the contrast with the savage sublimity of the Alps.

Each of the valleys contains villages and hamlets; several hamlets are ranged in groups on the side of the mountain, and the principal one of the group is distinguished by the parish church. The lower parts of the valleys are very fertile; they produce barley, oats, and rye, all sorts of fruit, excellent wine, and above all rich pastures, which feed a great number of cattle and flocks of sheep. The Val d'Aosta supplies the neighbouring province with butchers' meat, butter, and cheese. The peasants of Aosta are industrious; most of them are possessed of some land, and those of the upper valleys, who are the poorest, emigrate for the winter, and earn their bread by various callings in the neighbouring countries, from which they return in summer for the labours of their scanty fields. Some have mules, and act as carriers or guides across the Alps. A very large proportion of the women are afflicted with *goîtres*. [CRETINS.]

In the Val d'Aosta there are all seasons and climates within a short range. On the Alpine summits are perpetual ice and snow; next are forests of firs and larches; lower down, chestnut and walnut-trees; then vines; and, lastly, the olive, almond, fig, and mulberry-trees growing in all the luxuriance of the south. The traveller who descends the St. Bernard finds at once the climate and the sky of Italy, he hears the shrill cicala, and feels a sun as hot as that of Naples. It is only at the south-eastern extremity of the duchy of Aosta that the mountains leave an outlet into the lowlands of Piedmont, through which the Dora makes its way, and by the side of the river is the only road passable for carriages. Near Monjovet, and lower down, between Bard and Donaz, the rocks have been cut through, and a road twelve feet wide has been made with a parapet on the river side hewn out of the rock itself. The fort of Bard, which for several days checked the advance of Bonaparte's army in May, 1800, commands this pass, and is garrisoned by Sardinian troops.

Aosta is rich in minerals: iron, copper, lead, manganese, cobalt, crystal and rock-salt are found; particles of gold are found in some of the streams, especially in the stream which flows through the valley of Challant. Mineral springs also

abound. There are iron works, in which the water-power of the mountain-streams is made available, at St. Vincent, near Chatillon, Monjovet, St. Marcel, Gressan, Cogne, &c.

The province is governed by an intendant-general. The population in 1826 was 64,640; in 1838 it was 78,110; distributed over 7 *mandamenti*, or districts: Aosta, 17,433: Chatillon, 12,399: Donaz, 11,311: Gignod, 7,102: Morgex, 9,826: Quart, 9,573: and Verrès, 10,466. These are subdivided into 73 smaller districts called *comuni*.

The chief town of the province is Aosta, built in an opening where several valleys meet, and at the junction of the Dora Baltea and the Butier, 50 miles N.W. from Turin, and 65 S.E. from Geneva, in 45° 45′ N. lat. and 17° 16′ E. long.; population 6000. It is the seat of a bishop, and the residence of the intendente, or military governor of the province. There is a tribunal of justice, a royal college, two hospitals, three churches, and a cathedral in the town: its chief architectural attractions, however, are the ancient Roman structures which it contains. Among these are a triumphal arch, a round tower, and an amphitheatre. Aosta is a corruption of Augusta. The Roman name was *Augusta Prætoria*.

AOSTA, Town. [AOSTA, Province.]

APANAGE (*Apanagium, Apanamentum*), the provision of lands or feudal superiorities assigned by the kings of France for the maintenance of their younger sons. Some of the proposed etymologies of the word apanage are mentioned by Richelet, 'Dictionnaire de la Langue Françoise.'

The prince to whom the portion was assigned was called *apanagiste* or *apanager;* and he was regarded by the ancient law of that country as the proprietor of all the seigniories dependent on the apanage, to whom the fealty (*foi*) of all subordinate feudatories within the domain was due, as to the lord of the 'dominant fief.'

Under the first two races of French kings, the children of the deceased king usually made partition of the kingdom among them; but the inconvenience of such a practice occasioned a different arrangement to be adopted under the dynasty of the Capets, and the crown descended entire to the eldest son, with no other dismemberment than the severance of certain portions of the dominions for the maintenance of the younger branches of the family. Towards the close of the thirteenth century the rights of the apanagiste were still further circumscribed; and at length it became an established rule, that upon the failure of lineal heirs male the apanage should revert to the crown.

By a law of 22nd November, 1790, it was enacted, that in future no apanage *real* should be granted by the crown, but that the younger branches of the royal family of France should be educated and provided for out of the civil list until they married or attained the age of twenty-five years: and that then a certain income called *rentes apanagères* was to be granted to them, the amount of which was to be ascertained by the legislature for the time being.

By a law of March 2, 1832, which regulates the civil list of the present King of the French, it is provided, that in case of the insufficiency of the private domain of the crown, the dotations of the younger sons of the king and of the princesses his daughters shall be subsequently arranged by special laws. Before this law, the head of the house of Orleans was in possession of all that remained of the ancient apanage of his house, in virtue of art. 4 of the law of 15th January, 1825, according to which the property restored to the branch of Orleans by several royal ordinances of 1814, would continue to be possessed by the chief of that branch until extinction of male issue, when the property would return to the state. At the revolution of 1830 the apanage of Orleans was united to the crown, which gave the younger princes a claim for compensation from the country, recognised by the 21st art. of the law of March 2, 1832. This claim, according to the terms of the article, is only admissible when the private domain of the crown is insufficient, and the right is co-existent only with the insufficiency. ('Moniteur Universel,' 30th June, 1844.) No allowance from the state has yet been made to the family of the present King of the French.

The system of apanages was mainly formed in Germany by the high nobility. An apanage is there defined to be a provision for the proper maintenance of the younger members of a reigning house upon the establishment of the law of primogeniture, and out of the property which is subjected to this law of descent. The provision for the younger members was called 'deputat' and by various other names till the seventeenth century, when the French expression 'apanage' was introduced into use. The word 'paragium' also, which in France signified a smaller part of the fief that had been appropriated to a younger son, was used and applied to those cases where the income of a portion of the territory was made Deputat. The allowance which younger sons and their descendants have thus the right to claim from the ruling prince or possessor of the family fideicommissum is generally fixed more precisely by family arrangements. A father who possesses an apanage, as a general rule, transmits his apanage to his legitimate offspring by an equal marriage (not a marriage of disparagement), and in case there is no such offspring the apanage reverts to the reigning prince. There are also cases, though much more rare, in which an individual received an apanage on the condition that it reverted on his death.

The name apanage is now also given to the allowance assigned to the princes of a reigning house for their proper maintenance out of the public funds. Such apanages are introduced in those cases where a civil list is established, and the property originally intended for the support of the members of the reigning family has either been converted wholly or partly into public property, or is administered as public property; and these apanages are substituted for the claims of the younger members of such families as apaganistes on him who holds the family fideicommissum. In states where there has been no change of family property into state property, the reigning prince may be properly enough left to provide for all the members of his family out of the means supplied

him by the civil list. There may, however, be political reasons for making certain allowances to the members of the reigning family, independent of the civil list that is granted to the ruling prince. But as in modern times neither the honour of a nation nor the dignity of the members of a reigning family depends in any degree on the amount of the expenditure which such members make out of the public treasury, so there are no reasons whatever for making them any independent allowance, except reasons of general interest. Accordingly, in what are commonly called constitutional monarchies, where the princes of the royal family are called to any active participation in the offices of state, the allowance of a suitable income out of the public treasury may serve to give them a more independent position with respect to the head of the state. Such an allowance may also serve, in the case of princes who stand in the line of succession, to give to those who may be the future heads of the state the respect due to their station, and to secure them a suitable and certain income, and thus to draw more closely the ties which unite them and the people.

(Rotteck and Welcker, *Staats-Lexicon*, art. by P. A. Pfizer.)

A'PATITE, a mineral substance crystallized in the regular six-sided prism, usually terminated by a truncated six-sided pyramid. It has usually a yellowish green tint, and is translucent. In hardness it ranks above fluor-spar, and below feldspar. It is a compound of phosphate of lime with fluoride of calcium.

This mineral principally occurs in the primitive rocks, and is found in the tin mines of St. Michael's Mount, Cornwall; in those of Bohemia and Saxony; and in mineral beds met with in Estremadura in Spain.

APE (*Affe* German, *Aap* Dutch), a group of quadrumanous animals, approaching in external configuration, and in some points of anatomical structure, nearer to the human species than do any others of the lower orders of mammalia. Under this term are included the Chimpanzee, the Orangs, and the Gibbons, arranged by most naturalists respectively in three genera, viz. *Troglódytes*, *Pithécus*, and *Hylóbates*.

They possess the following characters in common. Tail wanting; arms extremely long; stomach simple; cœcum with a vermiform appendix; cheek pouches wanting. Incisors $\frac{4}{4}$ strong and large; canines $\frac{1-1}{1-1}$, formidable; molars $\frac{5-5}{5-5}$, tuberculous. The paws, both of the anterior and posterior extremities, formed for grasping; thumb of the anterior paws short, of the posterior powerful, and opposable to the fingers. Habits arboreal.

The arms are remarkable for their extreme length, and the posterior limbs for their comparative shortness and their bowed or inward tournure, the knees being turned outward, and the feet articulated at the ankle joint in such a manner that the soles turn obliquely inwards, so as to face each other; they can thus be brought with the utmost readiness to apply themselves to the upright branches or trunks of trees, a firm grasp being thereby ensured. On the ground these animals are awkward and waddling; they tread rather on the outer edge of the sole than on the sole itself; while stooping slightly forwards, they use their long sinewy arms as crutches, and by their aid hobble along, often indeed swinging the body forwards, resting its weight on the half-closed fists, placed firmly on the ground. The great length of their arms gives these animals peculiar advantages in their native forests; they launch themselves from branch to branch with singular address, and climb to the topmost branches or pass from tree to tree with surprising facility.

The apes in general appear to be more grave, and less petulant and mischievous, than the ordinary monkeys; when young, if we are to judge from those kept in confinement, they are gentle, affectionate, and intelligent; but there is some reason to believe that when adult they become fierce and intractable. The aspect is melancholy; the lips are very flexible, and capable of extraordinary protrusion.

1. The *Chimpanzee* (*Troglódytes niger*, Geoffr.). The generic characters of the Chimpanzee are as follows. Muzzle long and truncated anteriorly; supra-orbital ridges prominent, behind which the forehead recedes directly backward; no cranial ridges; facial angle 35°. External ears large, and standing out; tail wanting; ischiatic protuberances covered with a naked coarse skin on the adult; arms, in the erect attitude, reaching below the knee-joint; feet wide, the thumb extending to the second joint of the adjoining toe, and always furnished with a nail; canines large, overpassing each other, their points being lodged respectively in intervals of the opposite teeth. Intermaxillary

The Chimpanzee.

bones anchylosed to the maxillaries during the first dentition; ribs, thirteen pairs; laryngeal

sacculi small. Country, Western Africa, bordering the torrid zone, between lat. 14° N. and 10° S.

Of all the ape tribe the Chimpanzee is the most anthropoid, and the most adapted for terrestrial habits. The general figure is stout and short; the chest is broad, the shoulders square, the abdomen protuberant; the nose is flat, the nostrils divided by a very thin septum; the lips are extremely movable, and traversed by vertical wrinkles; the ample ears are naked; the eyes lively, deep-set, and chestnut-coloured; the neck is short; the arms slender but muscular; and the hands, when the animal stands erect, reach just below the knee. The fur is coarse, harsh, moderately glossy, long, and of a black colour, more or less mixed with grey on the lower part of the back, haunches, and thighs; the wrinkled cheeks are thinly furnished with short grey hairs. On the fore arm the direction of the fur is reversed from the wrist to the elbow; the back of the fore hand is naked; the hair of the head radiates from a centre; the skin of the face is dusky black, darker round the eyes; the ears and palms are of a dusky purplish black. In the young chimpanzee the skull is voluminous in proportion to the face, but as the animal becomes adult the jaws expand, the volume of the face enlarges, and preponderates greatly over that of the cranium. The adult male when erect measures about four feet from head to heel, or a few inches more; the female is smaller. Were the lower limbs in proportion to the bulk of the trunk, the height would be more considerable.

At different times within the last few years, young individuals of this extraordinary species have been brought to England, but none have reached maturity: they were remarkable for gentleness, confidence, affection, and intelligence.

In the dense forests of Sierra Leone, Guinea, Congo, Loango, &c., these animals live in large companies or troops, and are much dreaded by the natives. Lieut Matthews states, that 'they generally take up their abode near some deserted town or village where the papau tree grows abundantly, of the fruit of which they are very fond, and build huts nearly in the form in which the natives build their houses, which they cover with leaves; but these are only for the females and young to lie in—the males always lie on the outside. If one of them is shot, the rest immediately pursue the destroyer of their friend; and the only means to escape their vengeance is to part with your gun, which they directly seize upon with all the rage imaginable, tear it to pieces, and give over the pursuit.' The females are devotedly attached to their young, and are protected by the adult males with great resolution.

They travel in bodies, armed with clubs, and unite in defending themselves against wild beasts, and, as it is asserted, compel the elephant himself to abandon the districts in which they reside. It would doubtless be hazardous for a single person to come suddenly upon a troop of these animals, for they possess vast muscular powers, and have been seen to snap boughs of trees with the greatest apparent ease which the united strength of two men could scarcely bend.

M. de la Brosse, who describes these animals as being possessed of matchless strength and courage, states that they endeavour to surprise the negresses, whom they carry into the woods and force to live with them, feeding them plentifully, but otherwise doing them no injury. An instance of this kind came under his own observation. 'I knew,' he says, 'a negress at Lowanjo who had lived three years amongst these animals,' before she was able to effect her escape.

Lieut. Sayers ('Proceedings of Zool. Soc.,' 1839) states that the low shores of the Bullom country, situated on the northern border of the River of Sierra Leone, are infested by chimpanzees, and he heard their cries in the dense forest. 'They are exceedingly watchful, and the first one who discovers the approach of a stranger utters a protracted cry, like that of a human being in the greatest distress. The first time I heard it I was much startled; the animal was apparently not more than thirty paces distant; but had it been but five, I could not have seen it, from the tangled nature of the jungle; and I certainly conceived that such sounds could only have proceeded from a human being, who hoped to gain assistance by his cries from some terrible and instant death. The native who was with me laid his hand on my shoulder, and pointing suspiciously, said,—'Massa, Baboo live there;'—and in a few minutes the wood appeared alive with them, their cries resembling the barking of dogs. My guide informed me that the first cry heard was to inform the troop of my approach, and that they would all immediately leave the trees, or any exalted situation that might expose them to view, and seek the bush: he also showed evident fear, and entreated me not to proceed any farther in that direction. The plantations of bananas, papaus, and plantains, which the natives usually mix with their rice, constituting a favourite food of the chimpanzees, accounts for their being so frequent in the neighbourhood of rice-fields.' The natives believe that they possess the power of witching. Among the various names by which the chimpanzee is described in the works of travellers and authors, we may mention the following:—*Pongo* and *Engeco*, Battel in Purchas's 'Pilgrims,' vol. ii.; *Barys*, *Baris*, and *Quojas Morrou*, Barbot, Dapper, and others; *Smitten*, Bosman; *Quimpesé*, De la Brosse; *Pongo*, Buffon; *Jocko*, Audebert.

II. The *Orang-Outan* (*Pithécus Sátyrus*, Geoffr.). The generic characters of the orang-outan are as follows:—Muzzle large, elongated, somewhat rounded anteriorly; forehead sloping backward; superciliary ridges slight; margin of orbits prominent; facial angle 30°; laryngeal sac extensive and double; ears small; arms, in the erect attitude, reaching to the ankle joint; feet long and narrow, with the thumb not extending to the end of the metacarpal bone of the adjoining toe, and often destitute of the last or ungueal phalanx; canines enormous; ribs, twelve pairs; bones of sternum in a double alternate row; intermaxillary bones anchylosed to the maxillaries during the second or permanent dentition; ligamentum teres of the hip-joint wanting. Country, Borneo and Sumatra.

So different are the characters, especially in the form of the skull and face, dependent upon

The Orang-Outan.

age, which the orang presents, and in so many respects do the males differ from the females, that the history of this animal is enveloped in some difficulty. It may at once be observed that three distinct species are described; namely, the *Simia Satyrus* of Linnæus; the *Red Ourang* of Sumatra, or *Pongo Abellii* of Clark; and the *Black Orang* of Borneo, or *Pongo Wurmbii* of Geoffroy. With respect to the Simia Satyrus, it is merely the orang in a young stage; but whether the Bornean orang and the Sumatran orang are distinct species, is yet an unsettled matter. We believe them to be identical, having examined specimens both from Borneo and Sumatra. Professor Owen indeed distinguishes between them, and describes the cranium of the Bornean species as having the plane of the orbits more oblique, whence the line from the glabella to the incisor teeth is straight, instead of being concave, as in the Sumatran animal; and the symphisis of the lower jaw is proportionally deeper.

It would appear that there is a small species in Borneo, termed by Professor Owen *Pithecus Morio*, the skull of which exhibits very marked peculiarities (See 'Proceedings of Zool. Soc.,' 1836, p. 92; and 'Trans. Zool. Soc.,' 1838). We cannot help suspecting that some of the young living specimens which have been brought to this country belonged to this pigmy species.

With respect to the presumed difference in colour between the great orangs of Borneo and Sumatra, no stress can be laid upon it. All the Bornean orangs which we have examined have been rufous, or of a rich deep chestnut tint, none black; nor does the Sumatran species exceed the Bornean in stature, although, according to Dr. Abel, the male orang killed at Ramboom, on the north-west coast of Sumatra (the account of which is in the 'Asiatic Researches,' vol. xv., 1826), exceeded seven feet in height. This, however, is palpably an error: the span of the arms of this specimen was only 8 feet 2 inches, and the length of the foot from the heel to the end of the middle toe 14 inches. Now, in a specimen of a female from Sumatra, in the museum of the Zool. Soc., the span of the arms is about 7 feet 2 inches, and the length of the foot 10½ inches, while the height of the animal, when alive, could not have exceeded 3 feet 5 or 6 inches. As the arms of the orang extend to the ankle, Dr. Abel's orang, on his own showing, was not much more than 4 feet 1 inch from the shoulder to the ground; but as in measuring the span of the arms the breadth of the chest is included, this breadth, about 18 inches, must be taken off, and the height at the shoulder will be still less; but allowing 18 inches for the head and neck, we come to the same admeasurement, viz. 4 feet 1 or 2 inches. The feet were 14 inches long; but Dr. Harwood ('Linn. Trans.,' vol. xv.) describes the feet of a Bornean orang which measured 15½ inches: hence, then, there are no grounds for the alleged superiority of stature of the Sumatran animal.

The adult male orang is remarkable for large fleshy callosities on the cheeks, wanting in the young and in the female. Description of a male specimen from Borneo in the Paris Museum:—The head is large, the forehead naked and retiring; large fleshy callosities, in the form of elevated and somewhat crescentic ridges, occupy the molar bones, extending from the temples, and giving a singular expression to the physiognomy. The eyes are small and closely set together; the nose is depressed, the nostrils oblique; the ears are small, and lie closely on the head; the lips are thick and fleshy, the upper one furnished with scanty mustachios; the chin is furnished with a long and peaked beard; the hair is very long and thick, falling in masses on the back and shoulders; it is long on the arms and legs, but scanty on the chest, abdomen, inside of the thighs, and anterior aspect of the humerus; that of the fore-arms is reverted to the elbow; the hair of the head is directed forward, from a common centre of radiation between the shoulders; the contour of the body is heavy and thick; the hands touch the heel; the thumb of the hind feet is nailless. General colour, deep chestnut. Total height, 3 feet 8 inches. Breadth of face across the tuberosities, 9 inches. We have measured a specimen 4 feet 6 inches in height, also from Borneo, in which the thumbs were nailless; and still larger specimens, some 5 feet 3 inches, French measure, are said to have been procured by Dr. Samuel Muller in Borneo. It is probable that, as in the human subject, the stature of the orang is subject to variation. The female is much lower in stature than the male.

Many young orangs have at different times been brought to England, but none have long survived the change of climate. On the ground they hobbled along, and dragged or swung the body forwards, between the long arms, used as crutches, treading on the outer side of the foot. Their address in climbing was extraordinary; they used the hands and feet as hooks, and in-

stead of bounding from branch to branch, swing themselves from one to another, the great length of the arms enabling them to reach to a great distance; every movement, however, was quiet and deliberate, but at the same time free and unconstrained. All the individuals which we have seen were very gentle, affectionate, playful, and intelligent; they were impatient of confinement, and when disappointed subject to paroxysms of anger, throwing themselves about and uttering a whining cry, and even screaming with rage, until pacified.

With respect to the habits of the orang in a state of nature, little is known. It does not appear to be gregarious, but lives alone, or perhaps in small families, frequenting the most secluded parts of the dense forests which cover the hilly districts in the interior of Borneo and Sumatra, where it is much dreaded by the natives: it is said to construct arbours among the topmost branches of the highest trees, with a covering of leaves and twigs, in which it takes up its abode. Each male is said to appropriate to himself a certain extent of forest territory, and jealously to protect his empire from the encroachments of a rival. Here, in solitary seclusion, he will repose for hours together in listless apathy, in his arbour, his habitual dwelling-place. Unless when roused his movements are slow and indolent, but when attacked he performs the most astonishing feats, and when driven to extremity defends himself with determined resolution. The term Pongo, applied by Battel and others to the chimpanzee, is now restricted to the orang.

III. The *Gibbons* (*Hylóbates*). Generic characters:—Muzzle depressed; nostrils small; head small; body slender; arms extremely long, reaching to the heel; thumb of fore-hands separated to the wrist from the fingers, and scarcely, if at all, opposable to the latter; palm very narrow; posterior extremities bowed and small; feet long and narrow, with the first and second toe sometimes united; ischiatic callosities present, but small; laryngeal sacculi present or absent; fur deep, full, and woolly. Country—Java, Borneo, Sumatra, Malacca, Siam. The gibbons are remarkable for their slenderness of contour and the length of their arms; the hands are long and hook-like, as are also the feet or hinder hands; in the latter the thumb is large and strong; and the first and second fingers are often more or less united together. In the Siamang this union is carried to the last joint; but in some species, as the *Ungka-puti*, it appears to be a variable character, the toes being sometimes united, sometimes not.

The gibbons are decidedly arboreal, and are active and rapid in their movements, launching themselves from branch to branch at vast distances—Duvaucel says even forty feet—the arms and hands alone being used in giving impulse to the body, which hangs as it were suspended. The action is so quick, and the hold taken of branch after branch by each hand alternately as the animal pursues its course is so momentary, that the creature's progress may be termed almost aerial. We have ourselves seen a gibbon in confinement clear spaces of 18 feet with the greatest ease, and that for an hour together without intermission, like a bird flitting rapidly from perch to perch, the branches appearing as if merely touched as the animal continued its exercise, the most wonderful precision marking every evolution. For example, a live bird was let loose; the gibbon marked its flight, launched itself to a distant branch, caught the bird with one hand in passing, and seized the branch with the other hand as if that alone had been its aim.

The voice of the gibbons is loud and sonorous, resounding through the woods: it is principally exerted in the morning, and the whole troop join in concert. These animals are gregarious in their habits, and when taken young are gentle, affectionate, and playful, and exhibit great intelligence.

In size the gibbons are far inferior to the orang, the largest not exceeding 3 feet 1 or 2 inches in height; but most are not more than 2 feet 6 inches; the chest is tolerably broad, but the abdomen is contracted, and the hips narrow. Several species are described, as the Siamang (*Hylobates syndactylus*), the largest of the group, of a black colour, with a large laryngeal pouch,

The Siamang.

covered with naked black skin; locality, Sumatra. The Agile Gibbon (Ungka-puti and Ungka-etam, *Hylobates agilis*), a species variable in colour; locality, Sumatra. The White-handed Gibbon (*Hylobates lar*), a native of Malacca and Siam. The Hoolock (*Hylobates hoolock*), a native of Assam. The Choromandus (*Hylobates choromandus*, Ogilby in 'Proceedings of the Zool. Soc.,' 1837), a native of the Malay peninsula? Harlan's Gibbon (*Hylobates concolor*), from Borneo. The White-cheeked Gibbon (*Hylobates leucogynis*, Ogilby in 'Proceedings of the Zool. Soc.,' 1840); locality unknown. The Silvery Gibbon, or Wouwou of Camper (*Hylobates leuciscus*); locality, Java.

APELLEANS, or APELLITES, a sect of heretics so called from their founder Apelles, who lived about the middle of the second century. Apelles and his heresies are mentioned by Augustine, Epiphanius, Tertullian, and Eusebius.

APELLES, one of the most celebrated Greek painters, is generally considered to have been a native of the little island of Cos in the Ægean Sea. Nearly all that we know about him, with the exception of some few scattered notices, is contained in the 10th chap. and the 35th book of Pliny's 'Natural History.' The time of his birth is not fixed, but we are told that he was at the height of his reputation in Ol. cxii., or about B.C. 332; and as he painted a great many portraits of Philip, the father of Alexander, he could not be a very young man in B.C. 336, the time of Philip's death. He also survived Alexander, who died B.C. 323. His chief master was Pamphilus, a Macedonian. Of his earliest essays we know nothing; but we are told that his diligence was unwearied, and that he never passed a day without doing something; 'ut non *lineam* ducendo exerceret artem:' Winkelmann interprets these words to mean, 'that he never passed a day without trying to improve himself as a draughtsman,' a sense which the words will very well bear.

A story is told of Apelles as having given rise to the well-known saying, that a shoemaker should not go beyond his last. Apelles placed a picture which he had finished in a public place, and concealed himself behind it in order to hear the criticisms of the passers-by. A shoemaker observed a defect in the shoe, and the painter forthwith corrected it. The cobbler came again the next day, and being somewhat encouraged by the success of his first remark, began to extend his censure to the leg of the figure, when the angry painter thrust out his head from behind the picture and told the shoemaker to keep to his trade. Apelles excelled in grace and beauty. He only used four colours, as we are told (Pliny). His favourite subject was the representation of Venus, the goddess of love, the female blooming in eternal beauty; and the religious system of the age favoured the taste of the painter.

Apelles painted many portraits of Alexander the Great, who, we are told, often visited his painting room. The great picture of Alexander by Apelles was in the temple of Diana at Ephesus; other pictures by Apelles were in Samos and Rhodes, and Rome contained several in the time of Pliny.

APE'LLICON, a personage principally memorable for his connection with the preservation of the works of Aristotle. According to Strabo (p. 608, &c. Casaub.), he was a native of Teos, but went to Athens, and was admitted a citizen of that state. He was very rich, and he spared no expense in amassing books; but Strabo says that he was rather a lover of books than a lover of wisdom. Among other libraries which he purchased was that which had been collected by Aristotle more than two hundred years before; and which, enriched as it was by the manuscripts of that philosopher himself, and of his pupil Theophrastus, had, according to a very improbable story, been long concealed from the world, until Apellicon bought it. When Sulla conquered Athens (86 B.C.), he carried to Rome the library of Apellicon, who had just died; and this particular collection, Plutarch says, he retained as his own property. Tyrannion the grammarian, who was a great admirer of Aristotle, contrived to ingratiate himself with Sulla's librarian, and obtained the privilege of using the manuscripts; but it was not until Andronicus of Rhodes [ANDRONICUS], who was an acquaintance of Tyrannion, undertook the task of correcting the writings and putting them in order, that they were published in a correct form. While Apellicon resided at Athens, he attached himself to the faction of the Peripatetic philosopher Athénion, whom the chances of civil confusion placed for a short time at the head of affairs, and he was invested with the command of the island of Delos. In this situation he conducted himself with great incapacity; and the Romans, effecting a descent upon the island, put nearly all the garrison to the sword. Apellicon escaped to Athens; he died there a short time before the capture of the city by Sulla. (Bayle, in articles 'Andronicus' and 'Tyrannion;' ARISTOTLE.)

APENNINES, the general name for the great mountain-system of Italy.

Geographical Position.—The Apennines are a sort of prolongation of the Maritime Alps. The north-western extremity of the Apennines is situated near the sources of the river Bormida, north of Finale. From this point (about 44° 16′ N. lat., 8° 18′ E. long.) they stretch in a north-easterly direction until they reach the pass of the Bocchetta, due north of Genoa; thence they continue to run eastward, and a little to the south, to the neighbourhood of Pontremoli. Their course has then a general south-east direction, but not without some deviations, through the peninsula, at a nearly equal distance from the coasts of the Adriatic and Mediterranean, to Capo di Leuca, on the eastern side of the Gulf of Taranto. From the centre of Calabria a branch extends nearly due south to Cape Spartivento (37° 56′ N. lat., 16° 5′ E. long.), the farthest extremity of Italy. The length of the chain is about 650 English miles in a direct line; but, including its windings, it is little short of 800 miles.

The general outline of the Apennines presents neither the vertical needles of the Alps, the sharp peaks of the Pyrenees, nor the long rocky cliffs or escarpments of the Jura mountains; their forms are smooth, rounded, and wavy, bare rocks scarcely ever appearing, except in the highest parts. The great chain is usually divided into four principal groups, called the Ligurian, Etruscan, Roman, and Neapolitan Apennines.

1. The *Ligurian Apennines* encircle the Gulf of Genoa from the Maritime Alps to Monte Gisa, north of Pontremoli, at the source of the little river Magra; and from thence they stretch in a south-easterly direction as far as the borders of Tuscany. The length of this group is about 120 miles; the crest of the mountain chain is from 7 to 30 miles distant from the Mediterranean, and from 30 to 50 miles from the Po. The highest point of the group is Monte Pellegrino, 5161 feet. The sea-ward slope is abrupt, and much broken by steep gullies; the land-ward slope gives rise to the rivers Bormida, Scrivia, Nura, Trebbia, Taro, Grostollo, and Secchia—all tributaries of the Po. The group is crossed by roads

at the passes of Montenotte, Bocchetta, and Cento Croci; and the road called the Corniche goes along the coast from Nice to Leghorn.

2. The *Etruscan Apennines* extend from Monte Pellegrino to Monte Cornaro, in 12° 3′ E. long., and in a direct line between Florence and Fano, a distance of about 75 miles. In this group the mountain chain approaches nearest to the Adriatic, Monte Cornaro being about 24 miles from Rimini on the Adriatic, and nearly a hundred from Orbitello on the west coast. On the western side, the mountains throw out numerous branches and fall gradually towards the Mediterranean. The highest point of the group is Monte Cimone, 6975 feet. The rivers Tiber and Arno rise in this group. The group is crossed by two great roads, at the passes of Fimalbo and Pietra Mala.

3. The *Roman Apennines* run nearly through the centre of the peninsula, from Monte Cornaro to Monte Velino, which is almost due east of Rome, a distance of about 145 miles. In this group are the most lofty points of the Apennines; viz. the Gran Sasso d'Italia, of which the summit, Monte Corno, is 9521 feet; Monte Velino, 8183 feet; Monte Vetora, 8135 feet, &c., all snow-capped throughout the greater part of the year. Several minor branches are thrown off by this group.

4. The *Neapolitan Apennines* extend from Monte Velino to the two extremities of the Terra di Otranto and Calabria, Cape Leuca, and Cape Spartivento; they no longer form one great range, but rather a diverging group of subordinate chains. One of the subordinate chains extend from Monte Chilone to the promontory of Garganum; another from Venosa to Otranto; another from Venosa to Cape Campanella; while the main chain stretches from the neighbourhood of Venosa to the extremity of Calabria, and rises in many places into mountains of great height. The most lofty of these, Il Pollino, is 7076 feet high.

Geological Structure.—Among the stratified rocks of the Northern Apennines are three great deposits:—the lowest is an assemblage of gneiss, mica-slate, clay-slate, talc-slate, and a semi-granular limestone; the next, an assemblage of argillaceous slates, marly sandstones, and slates, sandstones, and limestones; and the uppermost consist of a series of marly limestones, and a sandstone called *macigno*, with impressions of marine plants. These strata, together with some partial deposits of conglomerate, are all more or less inclined. Upon these are found, in detached spots of limited extent, deposits of tertiary formation, usually in horizontal stratification. Among the unstratified rocks of Liguria, serpentine is by far the most important: in many parts it forms detached groups of hills. A variety of serpentine, containing a mixture of felspar and diallage, called in the country *granitone*, is found in several places; and occasionally of a quality that makes it applicable for works of ornament. Near the southern extremity of the Ligurian Apennines, there is a distinct group, called the Alpi Appuani, separated from the main range by a considerable depression. In this group are situated the celebrated marble quarries of Carrara [CARRARA], the limestone of which is regarded as being of the same geological age as the oolite or Jura limestone, containing fossil remains.

After leaving Liguria, the rock of which the greater part of the Apennines is composed is a limestone which presents itself under different aspects. It contains very few fossils, and affords little interest to the geologist. On the western slope the limestone is mostly covered by tertiary and volcanic products, so that it seldom appears far from the central chain, unless when the subordinate branches rise to considerable heights. On the eastern side the tertiary deposits do not extend so far south as on the western.

Low hills of rounded undulating forms skirt the northern slopes of the Ligurian Apennines, and cover the greater part of the country on both sides of the Tuscan and Roman Apennines between the mountains and the sea. They have been called by geologists the *Sub-Apennines*, as they never rise above a moderate degree of elevation. They are composed of marls, covered by yellow sand. Mr. Lyell refers them to three different geological epochs. He considers that the tertiary strata of the hill of the Superga, near Turin, as well as the greater part of those in the valley of the Bormida, belong to the Miocene period; that the greater part of the Sub-Apennine formations of Northern Italy and Tuscany, and perhaps those around Rome also, belong to the older Pliocene period; and that the tufaceous formations of Naples, the calcareous strata of Otranto, and probably the greater part of the tertiary beds of Calabria, were deposited during the newer Pliocene period. The marl of these hills is in some places 2000 feet thick. The sand with which it is covered sometimes passes into a calcareous sandstone. The organic remains found both in the marl and in the sand are very numerous. Among the most remarkable are some found in beds which must have been deposited in fresh-water lakes. They occur in three basins or hollows in the Upper Val d'Arno, where the beds consist of rolled pebbles, sand, clay, and fossil bones. Among the bones are those of the mástodon, elephant, rhinoceros, and hippopotamus. Brocchi relates that such is the quantity of elephants' bones, that the valley is like a vast cemetery of these gigantic animals, and that, before the peasants learned to keep these relics for sale to the curious, they used to inclose their gardens with legs and thigh-bones of elephants.

The volcanic region of the Apennines is nearly confined to the middle part of Italy, and to the western side of it. The volcanic district, properly so called, is bounded on the south by Cape Campanella on the south side of the Bay of Naples, and on the north by the river Ombróne, which enters the sea a little to the south of the island of Elba; the distance between those limits is about 230 miles. Volcanic action has long ceased in every part of this district, except at its southern extremity; and there are no historical records of that action, except with respect to Vesuvius and the country immediately contiguous. The volcanic matter which covers the country is mostly in the state of ashes and cinders, either loose or aggluti-

nated together, forming what the Italians call *tufa;* but there have been also eruptions of solid lava in many places, which are now seen in the form of beds and cliffs of hard rock. [VESUVIUS; VOLCANO.]

There are deposits still newer than the volcanic ejections; these are of fresh-water formation, and are an important feature in the physical structure of the country. They are composed of sands, clays, and marls, and of the solid stone called travertino, a corruption of the ancient name for it, viz. *Tiburtinum*, because it was found in great abundance near the town of Tibur. All these deposits contain lacustrine shells, particularly such as frequent stagnant waters. The travertino is a deposit from water holding carbonate of lime in solution, by means of the carbonic acid which is common in spring waters; by exposure to air the carbonic acid escapes, and the carbonate of lime is deposited: such springs abound in many parts of central Italy within the volcanic region. There are vast deposits of this travertino, which is used for building purposes.

The vegetable productions of the Apennines resemble very nearly those of the Alps. [ALPS.]

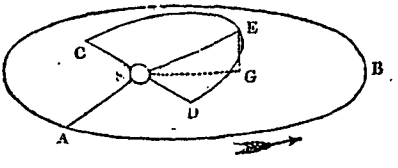
APENRADE, a Danish sea-port, situated at the bottom of the Gulf of Apenrade, in the Little Belt, in the duchy of Schleswig, 55° 8′ N. lat., 9° 38′ E. long.: population 3200. The harbour is shallow, and the shipping are moored about a hundred yards below the bridge.

APEREA. [LEPORIDÆ.]

APERIENTS. [CATHARTICS.]

APE'TALOUS PLANTS constitute one of the divisions in Jussieu's 'Natural System.' They comprehend all genera which are dicotyledonous or exogenous, and which have a calyx without corolla.

APHE'LION, from the Greek *ἀπὸ, from,* and *ἥλιος, the sun,* means that point of a planet's orbit which is farthest from the sun. Its opposite point is the PERIHELION, from *περὶ, near to,* and *ἥλιος the sun,* which is the nearest point to the sun.



Let S represent the sun, S A B the earth's orbit, or plane of the ecliptic, and S A a parallel to the line in which the earth's equator cuts the ecliptic, from which line all heliocentric longitudes (that is, measured round the sun) are measured in the direction of the earth's motion, represented by the arrow. Let C D E be a part of the orbit of a planet, S E the longest line which can be drawn through S, then E is the aphelion of the planet. If a plane S E G be drawn perpendicular to the ecliptic, the angle A S G is the heliocentric longitude of the aphelion E. The term is not usually applied to satellites, though they too have their aphelia.

APHIS, the plant-louse, or *puceron*, an extensive genus of insects which feed on the juices of plants, to the great injury of the farmer and gardener, on whose crops many species commit extensive depredation. Among these the hop-fly (*A. Humuli*), the bean dolphin (*A. Fabæ*), the apple aphis (*A. Lanigera*, Illig.; *Eriosoma Mali*, Leach). The rose aphis and others are well known.

These insects (order *Homóptera*; Stephens) have the body soft and oval, a small head, entire and semi-globular eyes; antennæ of seven joints longer than the body, sometimes setaceous, sometimes thickened towards the top, the two basal joints being short, the next long and cylindrical. The beak, or haustellum, arises from the under part of the head, and descends almost perpendicularly. The wings, when developed, are four in number. The legs are long and slender. Many are wingless, and of the same species there are both winged and wingless individuals of both sexes.

The aphis produces living young; those produced in autumn are enveloped in a sort of downy cocoon, and remain torpid during the winter, and are called into activity on the return of spring; these, it appears, are all females, no males appearing till the summer has advanced; yet they are fertile, and without pairing produce young. Indeed, as has been proved by experiment, nine generations may succeed each other without the females having paired in the course of three months. Had not this fact been verified by the most careful experiments of Trembley, Réaumur, Bonnet, Bazin, and others, we might hesitate to receive it. M. Latreille states that a single female will produce about twenty-five young a day during the summer months, and M. Réaumur calculates that one aphis may be the progenitor during its life of the enormous number of 5,904,900,000 individuals. Well may the hop-grower dread their appearance.

Most species are furnished with two tubes projecting from the abdomen, from which a sweet viscid fluid called *honey-dew* is distilled, of which ants are extremely fond. [ANT.]

A'PHORISM (*ἀφορισμὸς*), literally, 'a limitation,' or 'a fixing of limits,' and hence used by the Greek writers to express a short sentence, containing a moral precept, or a rule of practice, briefly and forcibly expressed. The term has been adopted in medicine. For instance, both Hippocrates and Boerhave have written books entitled 'Aphorisms,' containing medical maxims, not treated argumentatively, but laid down as certain truths. For example, 'Neither repletion nor hunger, nor anything which exceeds natural limits, is good.'

Sayings of this description are well adapted to make an impression on the memory; but they tend to substitute authority instead of judgment as the motive of action, and may therefore be as well applied to maintain prejudices as to assert truths; to impose conventional and needless restraints, as to furnish safe rules of conduct to the inexperienced. It is with reference to this that

Milton uses the word: 'There is no art that hath been more cankered in her principles, more soiled and slubbered with *aphorisming* pedantry, than the art of policy.'

APHRODI'TE, the goddess of love and beauty. According to Homer, she was the daughter of Zeus and Diône, one of the Nereides, or ocean nymphs; a later legend, told by Hesiod ('Theog.' 188), relates that she sprung from the foam of the sea. There was a celebrated picture of her rising from the sea, esteemed the master-piece of Apelles. She first came to land at the island of Cythêra, and thence proceeded to Cyprus. She was given in marriage to Hephæstus (Vulcan), the god of metallurgy, and there is a well-known tale of her detection in an amour with Ares (Mars), ('Odyss.' viii. 266). In the Trojan war she was ranged with Apollo and Ares on the side of the Trojans, and in attempting to protect her son Æneas was wounded by Diomédes. According to the fictions of the 'Æneid,' she continued to extend her maternal care over Æneas, and brought about his establishment in Italy, and through him the Julian family derived their descent from her. To the Italians she is known by the name of Venus; a goddess, probably, of indigenous origin, but so confounded in the fictions of poets and mythologers with the Greek Aphrodite, that her original attributes have nearly disappeared.

The goddess is usually represented naked, or with very scanty drapery; her peculiar attribute is the cestus, or embroidered girdle, which had the power of inspiring love for the person who wore it. Her favourite animals were the swan, the sparrow, and the dove; her favourite plants, the rose and myrtle. Many representations of the goddess in sculpture, on coins, &c., are extant; among these, the celebrated statue called the Venus de' Medici is that with which we are most familiarized.

APHTHO'NIUS, a Greek rhetorician of Antioch, whose epoch seems rather difficult to fix. Some place him about the end of the second century A.D.; others, as Fabricius, in the third; and other critics still later. There is a curious passage in Aphthonius about Alexandria. (De Sacy's 'Abd-Allatif,' p. 182.) Aphthonius has left forty Greek fables.

The rhetorical work of Aphthonius is an elementary treatise; and in the sixteenth and seventeenth centuries it was much in use, and there were numerous editions of it.

Aphthonius was first printed by the elder Aldus with the other rhetoricians, 'Rhetores Græci,' Venice, 1508, fol. The latest edition is by J. Scheffer, Upsal, 1670 and 1680, 8vo., with the 'Progymnasmata' of Theon.

A'PHYLLUM. (Artis.) [ASPIDIARIA.]

APIAN, PETER, an astronomer, and, we may add, astrologer, born at Leipzig in 1495, died at Ingoldstadt, where he was professor of mathematics, in 1552. His real name was Bienewitz. *Biene* in German signifies 'a bee,' whence the Latin Apianus. He was in favour with Charles V., who gave him an order of knighthood and the title of Count, as well as more substantial rewards. He is principally remarkable for his observations of comets, and is said to have been the first who observed that their tails are generally turned from the sun; but this had been previously done by Fracastoro. He also attempted the solution of astronomical problems by mechanism, as described in his 'Opus Cæsareum,' and pointed out, in his 'Cosmographia,' the use which might be made of lunar observations in finding longitude. His son Philip succeeded him at Ingoldstadt, which place he was obliged to quit in 1658, on account of his embracing the Protestant religion. Philip enjoyed some celebrity as an astronomer and mathematician, and died professor at Tübingen in 1589. Apian preserved, in his 'Opus Cæsareum,' observations of the comet of 1531, without which Halley could hardly have obtained sufficient grounds for his famous prediction.

APIARY, a place for keeping bee-hives (from the Latin *apis*, 'a bee,' and formed like the word aviary from *avis*, 'a bird').

From the time of Virgil to the present day the most proper situation for the apiary has engaged attention. All agree that it should be 'to gusts of winds impervious;' but in other points writers disagree. Wildman tells us that it should face the south and west, the mouth being placed westerly in spring, lest the glare of the morning sun in the colder months should tempt the bees to issue forth, to their own destruction. Evans directs the apiary to be screened from the east and face the west, that the setting sun may light the bees home. Bonner, however, recommends an easterly aspect; in Germany this aspect is not uncommonly selected. A westerly aspect, however, sheltered alike from cold and from intense heat, appears to be the best. Virgil recommends an apiary to be in the proximity of clear springs, with bordered ponds, and shallow brooks running through flowery meads. He advises that willows be thrown across the water, or large stones put into it, so as to rise above its surface, on which the bees may alight and expand their wings in the sun, if by chance the boisterous wind has blown them into the flood. Sweet flowering plants should grow around in abundance, as thyme, violets, &c. ('Georgic.,' lib. iv.) Dr. Bevan disapproves of the situation of an apiary near the borders of rivers or the sea, lest the bees be blown into the water; yet along the Rhine and the borders of the Swiss lakes thriving apiaries are numerous. The borders of wide heaths abounding in flowers, of fields of clover, sainfoin, &c., and of gardens where flowers are cultivated in profusion, are excellent sites for the apiary. In some countries, as Egypt, it is the practice to transport the apiaries to distant places, in order to take advantage of the succession of flowers. In Lower Egypt, for example, about the end of October, the bee-keepers embark on the Nile, and migrate with them into Upper Egypt, calculating to arrive there when the inundation is rapidly subsiding, and the flowers are beginning to bloom. Having stayed a short time in one place, till they suppose that the bees have collected all the honey and wax of the district, they remove two or three leagues

lower down, and so on, as the plants come into bloom. Thus gradually returning homewards, they collect the honey of the adjacent country, and about the beginning of February, having travelled the whole length of Egypt, arrive at the spots whence they had set out, and return to their habitations. Niebuhr saw upon the Nile, between Cairo and Damietta a collection of 4000 hives in their transit from Upper Egypt to the Delta.

Goldsmith describes a kind of floating apiary which he saw in some parts of France and Piedmont; it consists of a barge, bearing about a hundred beehives well defended from the inclemency of an accidental storm. With these the owners float gently down the stream. He adds that a similar method might be advantageously followed in England.

Dr. Bevan strongly recommends that the apiary be roofed; in fact, that a bee-house be built, and the hives or bee-boxes placed on strong shelves. Under the bee-house a potato cellar may be sunk, two thirds its depth in the earth, and the bee-house raised over it, having a couple of steps to the door. His own is built on this plan. Mr. Keys, on the contrary, dislikes both the plan of placing the hives on benches, and of keeping them under cots or sheds. He asserts that these cots are a harbour for enemies, and recommends that each hive should have a separate stand, supported by four strong stakes driven into the ground. Eight or ten hives in one place he considers are enough, and that it is better, when more swarms are to be disposed of, to place them in separate gardens to prevent quarrels, which often happen when the swarms are numerous. The various forms of hives are noticed under HIVE.

API'CIUS. There were three Romans of this name, all of them celebrated for their love of good eating. The first was contemporary with Sulla; the second with Augustus and Tiberius; the third with Trajan. Of these the second is the most famous, being celebrated by Seneca, Pliny, Juvenal, and Martial. Athenæus (p. 7, Casaub.) places him under Tiberius. The expense of his culinary establishment involved him in debt, and he found himself obliged to look into his affairs. He found that, when his incumbrances were cleared off, he should have left a pittance inadequate to keep such a body and soul together; wherefore, he took poison in preference to pining after unattainable luxuries. The third Apicius was the inventor of the art of pickling oysters (Athen. 7); several jars of which he sent to the Emperor Trajan when in Parthia. Distant as was their destination, they reached it in high preservation.

A treatise 'De Re Culinaria' is extant under the name of Cælius Apicius. It is considered by critics as ancient, although not written by any of the three whom we have mentioned. Martin Lister republished it in London in 1705, with the title 'De Obsoniis et Condimentis, sive de Arte Coquinaria.' Dr. King imitated it in a poem, entitled 'The Art of Cookery.'

APIIN, the peculiar principle of parsley, obtained from it by solution in water. It is nearly insoluble in cold water and alcohol, but soluble in either when heated; soluble in the alkalies, in lime water, in sulphuric acid, and in muriatic acid. Many of its solutions assume a gelatinous state.

APIOCRINI'TES (Miller), a fossil genus of Crinoidea, found in the oolitic formations and in the chalk.

A'PION, son of Poseidonius, was born in O'asis, a town in Libya, seven days' journey from Thebes, probably the modern oasis called El Wah. Apion was educated at Alexandria. When the Greek inhabitants of Alexandria endeavoured to deprive the Jews who resided there of their privileges, Apion was appointed to advocate their cause against the Jews. On this occasion he endeavoured to kindle the wrath of the Emperor Caius Caligula, by stating that the Jews would neither erect statues to the emperor, nor swear by his name, whilst they worshipped the head of an ass made of solid gold, which was stated to have been first discovered when Antiochus Epiphanes entered the temple at Jerusalem.

Apion, with this and other monstrous fables, did not fully succeed against Philo, who was sent to Rome by the Jews of Alexandria, to plead their cause. Philo, who was at the head of the embassy of the Alexandrian Jews, commenced his reply to Apion's accusation, but the emperor commanded him to leave the imperial presence. The emperor sent Petronius, the successor of Vitellius, as legate to Syria, with orders to place his statue in the temple at Jerusalem. Petronius marched an army into Judæa, but was so much touched with the intreaties of the Jews not to profane their sanctuary, that he requested the emperor to revoke his orders. Caius granted this revocation to his favourite, Herodes Agrippa, but commanded Petronius to commit suicide for his disobedience. The news of Caligula's death arrived in Syria before the letter in which Petronius was ordered to kill himself. Thus Apion's plan to hurt the Jews was foiled. (Joseph. 'Antiquities of the Jews.')

Of all the writings of Apion, there have only been preserved the story of 'Androclus and the Lion' (Gellius, v. 14); and the 'Dolphin at Dicæarchia' (Gellius, vii. 8); with fragments from the work against the Jews, preserved by Josephus in his reply.

Flavius Josephus wrote two books against Apion, after his death. In the beginning of the second book he refutes especially the misrepresentations of Apion and his authorities.

APIS, a sacred bull, whose temple was at Memphis in Egypt. The sacred bull of Heliópolis was called *Mneuis*. The real or true Apis was known from among all other bulls by certain marks, which are mentioned by Herodotus and Pliny (iii. 28; viii. 46). When the bull Apis died, or had been put to death after living the prescribed number of years (according to some authorities), a successor was sought for, and, when found, was installed in his temple of Memphis with all due solemnity.

The worship of Apis existed at least as late as the reign of Septimius Severus. We hear of

Greeks and Romans of rank paying their respects to the bull of Memphis. Alexander the Great, when he visited Memphis, sacrificed to Apis, in which he showed more political wisdom than the Persian king Cambyses, who, 200 years before, had insulted the Egyptians by stabbing their deity. Strabo, who travelled in Egypt, describes Apis and his temple (p. 807, ed. Casaub.) The bull Apis, it is presumed, (Herod. iii. 29), was embalmed when he died. Lucas says (vol. i. p. 345, 'Voyage fait en 1714') that he observed bulls' heads in several niches of the catacombs of Abousir: he also found a bull embalmed, and in a great chest, on which the head of the animal was represented; the case, he says, was gilded and painted. (De Sacy, 'Abd Allatif,' p. 201.)

The god Sivas, in the Indian mythology, has his sacred bulls, which are characterised by certain marks, and a colossal bull of stone is often an ornament of his temples. The bull (but not the cow) is an object of worship still in India. (Colonel Briggs's 'Letters on India,' p. 72.) The sacred bulls of Benares still walk about the streets of the holy city, or stop up the road, and must not be disturbed without treating them with all due respect.

The tendency of the Israelites to fall into the idolatrous worship of the bull or cow is seen from the history in Exodus, xxxii. Jeroboam, who had spent some time in Egypt, set up two calves, one at Dan and the other at Bethel, and established temples and priests.

(1 Kings xii.; compare Hosea, chap. x.; Bohlen, *Altes Indien*, i. 252, &c.; Jablonsky's *Pantheon*.)

APIS. [Bee.]

A'PIUM is the botanical name of a genus of umbelliferous plants, among which the only species of any importance is the common Celery, *Apium graveolens*. This valuable vegetable is found naturally in the ditches of almost every part of Europe; it is even met with in the Falkland Islands, where, if it has originally been carried thither, it has naturalized itself. In this country it is very common in many places, as, for instance, in the ditches near Sandwich. [Celery.]

APLANATIC LENS (from the Greek ἀ, 'without,' and πλάνη, 'deviation' or 'aberration') is a lens which should be capable of so refracting all the rays which, diverging from or converging to any one point in the axis, are incident upon it, that after being transmitted through it they may converge to or diverge from one other point in the same axis.

It is proved that when a radiant point is at an immensely great distance from the refracting surface (as when it is at a celestial body), if the refracting medium be more dense than that in which the incident rays are, the form which should be given to the surface in order that the refracted rays may converge to or diverge from one point is that of a spheroid; if the refracting medium be less dense than that in which the incidence takes place, the surface should be that of an hyperboloid. The semi-transverse axis of either curve must bear to the eccentricity the same proportion that the sine of the angle of incidence bears to the sine of the angle of refraction. It follows therefore that if a meniscus lens denser than the surrounding medium have its anterior surface spheroidal, and its posterior surface that of a sphere whose centre is at the further focus of the spheroid, since the rays will then suffer no refraction in passing through the posterior surface, it will be aplanatic. Also if the anterior surface of a medium be plane, so that the parallel rays incident perpendicularly on it may suffer no refraction in entering, and the other surface be part of an hyperboloid, the medium between the surfaces being denser than that which surrounds it, the plane lens thus formed will be aplanatic; the refracted rays converging to the opposite focus of the hyperbola.

A spherical lens cannot, when formed of any known media, be made strictly aplanatic; and it having been found impossible hitherto to execute lenses with surfaces produced by the revolutions of conic sections, mathematicians have investigated expressions for the form under which, with a given refractive index, the aberration of the focus shall be a minimum; see the article 'Light' in the 'Encyclopædia Metropolitana' (art. 305), where the ratio between the radii of the surfaces in this state is given. From that ratio it is shown that, when the index of refraction is 1·5, the lens should be of the double convex form, having the radius of the posterior surface six times as long as that of the anterior surface, or that which is nearest to the radiant point.

For an investigation of the radii of the surfaces of lenses when two of them are combined together for the purpose of diminishing at the same time as much as possible both the chromatic and spherical aberrations, see Telescope; and in the treatise on Light just quoted (arts. 313, 469), Sir John Herschel has given four equations involving the refractive indices and the dispersive powers of the two lenses with their principal focal distances, from which the four radii may be obtained consistently with the condition that the aberration shall be zero. From the equations, and with different refractive indices, there is computed a table of the radii of the lenses for the compound object-glass of a telescope as nearly aplanatic as possible, the compound focal length being 10 inches; and by the proportions indicated the radii for object glasses of any other compound focal length may be found. On aplanatic lenses for microscopes, see Microscope.

APOCALYPSE. The word apocalypsis is Greek, and signifies literally 'uncovering,' 'unveiling,' and is used in the New Testament to express especially an extraordinary revelation of the will of God. But the word apocalypsis is used in a more confined sense, to express especially the prophetical revelation of the future development of the Messiah's kingdom.

In the history of the Apocalypse, or Revelations of John, we have to consider who was the author of the work who calls himself, at the commencement of the first chapter, 'Johannes a servant of the Lord.' Some critics have asserted that this description which the author gives of himself is a

proof that the Apocalypse was not written by the apostle St. John, but by another servant of the Lord, who would not assume any apostolic dignity; and, further, that in the usual title of the book he is not called St. John the apostle, but only John *the divine*, or the theologian. But most critics suppose that the present title to the Revelations can only refer to that apostle who wrote more explicitly about the divine *logos* than any other of the evangelists. Whoever compares the phraseology, imagery, and doctrine of the Apocalypse with that of the gospel and the epistles of St. John, will indeed find a great difference. The Greek style of the Apocalypse is strongly tinctured with Hebraisms, and its imagery is bold. The style of the gospel and the epistles approaches more nearly to the classic Greek, and is almost without imagery. The testimonies to the genuineness of the Apocalypse, in the early history of the church, are given with great fulness by a biblical critic in the 'Penny Cyclopædia.'

During the middle ages, the anti-catholic sects, as well as orthodox divines, appealed to the canonical authority of the Apocalypse, although they differed widely in its interpretation; but with the Reformation began another period in the history of the Apocalypse. Erasmus whispered to the learned, that we might feel inclined to ascribe the Revelations not to John the Evangelist, if the general consent, and especially the authority of the church, had not already settled its genuineness. Nevertheless he relates the opinions of Dionysius, and the uncertainty of Eusebius as to whether it belonged to the *Homologoúmena* (the admitted), or the *Antilegómena* (the disputed). What Erasmus hinted, Carlstadt and Luther proclaimed boldly to the people. The opinions of the great reformer influenced the Lutheran theology during the sixteenth century so much, that it became habitual to divide the New Testament into canonical and apocryphal books. To the canonical books only was ascribed an absolute authority in matters of faith; and the Apocrypha, to which the Apocalypse was referred, were considered as subsidiary sources of information. The reformers of Geneva, Calvin and Beza, seem to be more favourable to the Apocalypse. They quote it often without mentioning the Lutheran classification of canonical and apocryphal books of the New Testament. Calvin uses in his 'Institutio Relig. Christianæ,' the Apocalypse as canonical and apostolical. On the authority of these reformers the Apocalypse was sanctioned as genuine in the 'Confessio Helvetica Posterior,' the 'Thirty-nine Articles of the Church of England,' the 'Confessio Gallica,' and 'Conf. Belgica.'

APO'CRYPHA are such books as contain secrets and are kept in secret; consequently the term referred to those writings of the Gnostics and other sects which contained the knowledge of those mysteries which were communicated to their partizans only. These books are now known under the name of 'pseudepígraphi' (that is, 'books with false titles), as the books of Adam, Enoch, the Three Patriarchs, &c. These volumes formed a kind of heretical canon in opposition to the orthodox canon, and hence arose the signification of the name Apocrypha, which now means *not canonical*, or not belonging to those writings which form the canon of the Holy Scriptures. [CANON.] The name 'Apocrypha' is especially given to those additions which were introduced into the Septuagint translation of the Old Testament, from whence they were transferred into the Vulgate and many subsequent translations. The reformers separated the Apocrypha from the Old Testament, and Luther placed them between the Old and the New Covenants, under the title of Apocrypha, or books which are not to be esteemed equal to the Holy Scriptures, but are still profitable to the reader. In opposition to the reformers, the Apocrypha were declared to be canonical by the Council of Trent. About 1821, a debate arose in the British and Foreign Bible Society about the propriety of printing the Apocrypha together with the Holy Scriptures; and in 1826 it was decided that the Apocrypha should not be circulated by the British and Foreign Bible Society.

APOCY'NEÆ, a natural order of plants, belonging to the monopetalous subdivision of the dicotyledonous class. Among these they are known by their flowers being perfectly symmetrical, the segments of the corolla all twisted one way, like a catherine-wheel, five distinct stamens, a superior ovarium, which, when ripening, divides into two parts which diverge from each other at right angles, and by their stems yielding, when wounded, a copious milk. The latter is generally poisonous, and that character is to be taken as general in the order, which abounds in plants the action of which upon the human body is more or less violent; among these, the Tanghin poison of Madagascar [TANGHINIA], and the Nux vomica [STRYCHNOS], are remarkable instances. Notwithstanding this, some of the species are not unwholesome; as the hya-hya, or milk-tree of Demerara, and the cream fruit of Sierra Leone; caoutchouc is yielded in abundance by *Vahea* and *Urceola elastica;* and the bark of several species is a powerful febrifuge. Considering, however, the great prevalence of poisonous qualities in the order, drugs obtained from any of its species should be administered with very great caution until it has been satisfactorily ascertained that they may be employed without danger.

A'PODES, an order of fishes, including, according to the Linnæan system, all those which want the ventral fins; but restricted by Cuvier to those which, besides this character, are likewise malacopterygious. In this sense the apodes or apoda constitute a small natural group, of which the eel, the muræna, the gymnotus, &c. are examples.

APOGE'E, from ἀπὸ, 'from,' and γῆ, 'the earth,' an astronomical term applied to the apparent orbits of the sun and moon, signifying the points of those orbits which are at the greatest distance from the earth. It is opposed to *perigee*, which means the point nearest to the earth.

APOLDA. [SAXE-WEIMAR-EISENACH.]

APOLLINA'RIS, C. SULPI'CIUS, a grammarian who taught under the reign of the Antonines in the second century, at Rome. Aulus

Gellius, a disciple of Sulpicius, mentions his master repeatedly, and praises his learning, his moderation in refuting, and his urbanity in teaching. ('Noct. Att.' iii. 6; xiii. 17, 19; xviii. 4; xx. 6.) The short metrical arguments of the 'Comedies' of Terence are attributed to Apollinaris. Donatus quotes, in his 'Life of Virgil,' an epigram of six lines on the Æneid, under the name of Sulpicius of Carthage, who is considered to be the same person as C. Sulpicius Apollinaris.

APOLLINA'RIS, or APOLLINA'RIUS, a native of Alexandria, taught grammar at Bérytus (Beirout), a town on the coast of Phœnicia, and afterwards in Laodicéa of the same country. Apollinaris married, and became presbyter of Laodicea. His son, likewise called Apollinaris, was one of the greatest orators, poets, and philosophers of his age. Apollinaris, the younger, became professor of eloquence at Laodicea before A.D. 335, and afterwards lecturer of the Christian congregation. Both father and son were friends of Libanius, who was a heathen, and attended the lectures of Epiphánius the sophist, who then taught at Laodicea. Georgios, bishop of Laodicea, being an Arian, banished them, either on account of their continued intercourse with Epiphanius, or on account of their adherence to the Nicene Creed and the friendship of the younger Apollinaris for Athanasius. When Julian forbad the Christians to interpret the Greek classics, the Apollinaris, father and son, composed imitations for the use of schools. Socrates ('Hist. Eccles.' iii. 16) attributes to the father some epic poems and tragedies, founded on the history of the Old Testament; but Sozomenus ('Hist. Eccles.' v. 18) ascribes these productions to the son, who transformed also the New Testament into the manner and style of Platonic dialogues.

The younger Apollinaris was orthodox bishop of Laodicea A.D. 362, whilst Pelagius was bishop of the Arians in that city. Apollinaris distinguished himself especially by polemical and exegetical writings; for instance, by his work on Truth, against the Emperor Julian and the heathen philosophers. Hierónymus, during his residence at Antiochia (A.D. 373 and 374), enjoyed the exegetical instructions of Apollinaris. The interpretations of Apollinaris, quoted in the commentaries of Hieronymus, were valuable in those days on account of his knowledge of Hebrew. We learn from Gregorius Nazianzénus that his hymns and psalms were sung in Christian congregations. In 1552 was published at Paris, a 'Metaphrasis Psalmorum' of Apollinaris; this, and the tragedy on the suffering of Christ, in the works of Gregorius Nazianzenus, have been ascribed to Apollinaris.

Apollinaris, who had defended the Athanasian doctrine of the Trinity, himself subsequently incurred the reproach of heresy, because he taught that the divine *logos* occupied in the person of Christ the place of the human soul. According to him, Christ was ἐνσαρκος, 'incarnate,' but not ἔμψυχος, 'insouled.' His disciples were called Apollinarists. His heresy became generally known A.D. 371, but it was first condemned at the synod held at Rome A.D. 375. Upon this condemnation Apollinaris formed a separate congregation, over which he ordained the presbyter Vitalis as bishop. Hence the Apollinarists are also called Vitalians. They are also called Dimœrites, because they were accused of dividing the nature of Christ into two parts.

Before the death of Apollinaris, which happened between A.D. 382—392, the Apollinarists formed several separate congregations with their own bishops. After his death, the Apollinarists were divided into two parties, one of which, under Pólemo, or Polemius, and Timótheus, pretended that the divinity and the body of Christ were transformed into one substance, and consequently that the flesh was to be worshipped as well as the *logos;* these were called Polemians and Synousiasts, and also *sarkolatræ*, 'flesh-worshippers.' In retaliation, they called the orthodox *anthropolatræ*, 'men-worshippers.' The other party, which adhered to the original doctrine of Apollinaris, were called Valentinians.

By imperial command, the public worship of the Apollinarists was impeded A.D. 388 and 397, and A.D. 428 in all towns entirely prohibited. The sects of the Apollinarists assimilated, in the fifth century, partly to the orthodox, and partly to the Monophysites. [EUTYCHIANS.]

APOLLO, one of the gods of the Grecian heaven, also named Phœbus, and in Homer and Hesiod most commonly called Phœbus Apollo. He was the presiding deity of archery, prophecy, and music, and in later times of the sun: but, in Homer and Hesiod, the sun (Helius) is a different personage. Apollo was the son of Zeus and Leto (Jupiter and Latona). Apollo is a leading personage in mythological fiction, and a favourite with the poets. He was the president and protector of the muses. He is usually represented in the prime of youth and manly beauty, with long hair, his brows bound with the sacred bay-tree (*daphne*), bearing either the lyre, or the bow. His principal temples were at Delos, Delphi, Ténedos, Pátara, and Claros.

The word Phœbus is apparently connected with a Greek root, signifying 'light;' but the origin and meaning of the word Apollo are unknown. In later writers, and by the Latins, who do not appear to have had an ancient sun-god of their own, Apollo and the sun are confounded. Ovid, however, in the stories of Phaeton, and Clytie, which have especial reference to him in his character of the sun, always uses the word Sol, not Phœbus or Apollo, except once (ii. v. 399) at the conclusion of the former ('Metam.' ii. 1; iv. 190).

APOLLO BELVEDE'RE, a celebrated statue of Apollo, found at Capo d'Anzo, in the ruins of ancient Antium, about 32 miles from Rome, towards the end of the fifteenth century. It was purchased by Pope Julius II., before his elevation to the pontificate; and was placed by him in the Belvedere of the Vatican, whence it derives its present name. It has been said to be the work of Agasius the Ephesian, but no certain indications of the sculptor are to be traced. But it is now pretty well proved that it was made under the emperors, and probably by the order of Nero himself. (Thiersch, 'Epochen der bildenden Kunst,' &c.)

This statue, one of the finest specimens of sculpture extant, is a standing figure, more than seven feet high. It represents the god naked, except the cloak which is fastened round his neck, and hangs over the extended left arm. The left hand and the right fore-arm were lost, and were restored by Giovanni Angelo da Montorsoli, a pupil of Michel Angelo: so that the original action of the figure can only be conjectured. It was supposed, however, to represent the god at the moment of having discharged an arrow at the serpent Python, watching the effect of his weapon: and accordingly, in the restoration, part of a bow was placed in the left hand. A serpent, the emblem of the healing art, is fixed on the stump of a tree, which gives stability to the figure.

APOLLODO'RUS, an eminent Athenian painter, who lived about four centuries before Christ. (Plin. *Nat. Hist.* xxxv. 9.)

APOLLODO'RUS, a celebrated grammarian of Athens, was a pupil of Aristarchus. Of his voluminous writings, only three books of his 'Bibliothéca,' a mythological work, have come down to us. He wrote a chronicle or history in Iambic verse, extending from the destruction of Troy (B.C. 1184) to his own times (about B.C. 144). Among his other writings was a treatise on the Gods, on the 'Mimi' of Sophron, and on other subjects. The best editions of Apollodorus are by Heyne, 1782–1783, four volumes, and 1802, two volumes octavo; and that by Clavier, Paris, 1805, two volumes octavo, with a French translation.

APOLLODO'RUS, a celebrated architect in the reigns of Trajan and Hadrian, was born at Damascus. The magnificent stone bridge built over the Danube, A.D. 104, by order of Trajan, was executed under his direction. The remains of this bridge still exist near the junction of the Aluta or Alt and the Danube. He is also said to have been the architect of the Forum Trajanum, in which the column of Trajan stands, and to have built a library, a music-hall (Odeum), baths, and aqueducts. It is said that Hadrian put him to death on some false and frivolous pretence. Apollodorus is the author of a work on besieging towns (Πολιορκητικά) printed in the collection of Thevenot.

APOLLO'NICON, the name given to a chamber organ of vast power, supplied with both keys and barrels, built by Messrs. Flight and Robson, of St. Martin's Lane, London, and first exhibited by them at their manufactory, in 1817. It has 1900 pipes, the largest twenty-four feet in length, and one foot eleven inches in aperture, sounding the G, two octaves below the first line of the base, the highest giving the A in altissimo, two octaves above the second space in the treble. The number of stops is forty-five, and these in their combinations afford very good imitations of the various wind instruments used in an orchestra. As a self-playing instrument, the apollonicon is provided with two revolving cylinders, studded like that of a barrel organ. As a keyed instrument, it has five key-boards, of which the largest comprises five octaves. The swell, the compound pedals, and all the accessory arrangements, are on a very complex scale.

APOLLO'NIUS, a celebrated statuary, the son of Nestor of Athens, only known to us from his name being inscribed on the fragments of a statue which was discovered in the fifteenth century, and is now called the Torso Belvedere. It has neither head, arms, nor legs, and yet it is considered one of the masterpieces of antiquity. Michel Angelo was an enthusiastic admirer of it, and all agree that it is one of the finest specimens of ancient sculpture, but there is some doubt as to the period when Apollonius lived. Meyer, in his 'History of Greek Sculpture,' imagines that he discovers a great resemblance between the Torso Belvedere and the Ilissus of the Parthenon, while Thorwaldsen, acknowledging fully the merits of the statue, considers it the production of a much later age. Others think that this opinion is confirmed by the particular form of the letters in the inscription, but no dependence can be placed on this circumstance, as the name may have been inscribed centuries after the statue was executed. (Visconti, Pio Clementino, t. i. plate x.; Winkelmann, x. iii. s. 15; Thiersch, *Epochen der bildenden Kunst*, p. 333.)

APOLLO'NIUS, a celebrated statuary of the island of Rhodes; who, along with Tauriscus, executed a group in marble which represented Zethus and Amphion binding Dirce to the horns of a furious bull, to avenge their mother, Antiope, whom she had cruelly persecuted. This group, described by Pliny (xxxvi. 4), is supposed, with much probability, to be what is known to us under the name of the Toro Farnese, found during the reign of Paul III. in the ruins of the Baths of Caracalla. The lower half of the figure of Dirce, the two trunks and a leg of Zethus and Amphion, were the only remnants of the ancient sculptors, but it is sufficient to prove that the art was then in its highest degree of perfection. The group has been restored in the very worst taste by a Milanese artist, Batista Bianchi. We have no means of discovering, with any degree of certainty, at what time Apollonius lived; but some have imagined that it was a few years after Alexander the Great. (Piranesi, *Statue*; Maffei; Winkelmann, vi. i. p. 128; Müller, *Handbuch der Archäologie*, &c. p. 137.)

APOLLO'NIUS, PERGÆUS, after Archimedes, the most original and profound of all the Greek geometers, was born at Perga in Pamphylia, while Ptolemæus III., commonly called Euérgetes, was king of Egypt. Ptolemæus began his reign B.C. 247. Archimédes died B.C. 212, at which time Apollonius was living; it is not known when the latter died.

The life of Apollonius was passed at Alexandria, in the school of the successors of Euclid, under whom he studied. Gassendi, in his life of Copernicus, mentions an opinion attributed by the latter to the Grecian geometer, and which is said to have been also that of Philoláus, that the sun and moon only moved round the earth, but all the other planets round the sun. This, so far as appearances only are concerned, is a sufficient explanation of all the phenomena; and, next to the system now received, is the soundest of the hypotheses. We cannot find any other authority for

attributing this opinion to Apollonius. Vieta conjectures, with great probability, that there is a confusion of words: that this system was called *Apollonian* from its reference to the sun (Apollo). But Apollonius certainly paid attention at least to the then received system, since known by the name of the Ptolemaic, for Ptolemæus has preserved some theorems of his on the method of finding the stationary points of the planets supposed to move in epicycles. Proclus, in his commentary on Euclid, mentions that Apollonius attempted to prove the axioms, and cites his investigation of the theorem, that things which are equal to the same are equal to one another, in which, as may be supposed, propositions are assumed not more obvious than the theorem itself. The same author gives a definition of an angle which he attributes to Apollonius, but which we confess ourselves unable to understand. Vitruvius cites Apollonius as the inventor of a species of clock which he terms *pharetra*.

The remaining works of Apollonius are,—seven books of his treatise on 'Conic Sections,' and a treatise 'De Sectione Rationis.' But besides this he is known to have written treatises, according to Pappus, 'De Spatii Sectione,' 'De Sectione determinata,' 'De Tactionibus,' 'De Inclinationibus,' 'De Planis Locis,' and according to Proclus, 'De Cochleâ,' and 'De Perturbatis Rationibus.'

The 'Conic Sections' of Apollonius are in seven books, the four first of which are extant in Greek, with the commentary of Eutocius of Ascalon. The next three were supposed to be lost till the middle of the seventeenth century, when James Golius, a celebrated oriental professor of Leyden, returned from the East with the whole seven books in Arabic. Borelli, and Abraham Echellensis, an oriental professor at Rome, translated them from the Arabic, and published their version in 1661. The eighth book was still wanting, and a note to the version imported by Golius informed the reader that it had never been found, even by the Arabs, in the Greek. But when the Oxford press, at the commencement of the last century, was employed upon the magnificent versions of the Greek geometers, which are still the best in public use, Halley attempted a restoration of the eighth book from such light as was afforded by its preliminary lemmas, preserved by Pappus. The whole appeared at Oxford in 1710, with the commentary of Eutocius, the lemmas of Pappus, and in addition, the work of Serenus on the same subject. This is the only edition of the Greek text.

Apollonius was the first who used the words *ellipse* and *hyperbola*, of which Archimedes does not take notice, though he uses the term *parabola*. He also first distinguishes the *diameters* of the section from the *axes*. It was moreover in his time, and perhaps first by himself, that the *general* sections of the cone were considered; for previously it had been usual to treat only of those the planes of which were at right angles to one of the sides of the cone; so that an ellipse could only come from an acute-angled cone, and so on.

The most remarkable book in the whole work is the fifth, which treats of maxima and minima. With a little licence it might be called a complete treatise on the curvature of the three sections, for in considering the number of maxima and minima which can be drawn to the section from any point in its plane, the space inside and outside of the evolute has different properties. There is only wanting the addition of a name for the curve which separates the spaces (which we now call the evolute). This book, and the quadrature of Archimedes, are the highest points of the Grecian geometry.

Apollonius is supposed by some, among others by Vossius, to be the author of a commentary on Aratus: but Grotius, in his edition of that poet, takes no notice of the report, and as it is believed that Apollonius the grammarian also commented on Aratus, the two may have been confounded. Wallis, who held that the ancients possessed a certain algebra which they disguised, seems a little inclined to found this opinion upon a title-page which he discovered in the Savilian library (the rest being cut away). It was 'Liber de Arte Notoriâ, secundum Apollonium;' but he also suspects that the *Ars Notoria* may be *magic*, and the Apollonius may be Apollonius of Tyana. Algebra was called by many Italians *ars magna*, or *arte maggiore*. That Apollonius did improve the notation of arithmetic appears from the praise given to him by Eutocius, in his commentary upon the quadrature of Archimedes. Pappus states that the improvement consisted in a simplification of the method proposed by Archimedes for representing very large numbers, which brought the system nearer to that of the moderns. (Delambre, 'Hist. Ast. Anc.' ii. 9.) Eutocius also says, that Apollonius extended the quadrature of the circle given by Archimedes.

APOLLO'NIUS RHO'DIUS, a Greek epic poet. The place of his birth is unknown; but he derived the surname of Rhodius from his long residence in Rhodes. He spent his early years at Alexandria under the direction of the poet Callimachus. Callimachus died about B.C. 230, so that he must have been acquainted with this poet at an early age, for Apollonius succeeded Eratósthenes as keeper of the great library of the Ptolemies at Alexandria, B.C. 194. The cause of his quarrel with Callimachus is unknown, but the quarrel produced the 'Ibis' of Callimachus, which was directed against Apollonius; and though no fragments of it remain, we can form some opinion of its character from the 'Ibis' of Ovid, which is said to be an imitation of this poem. Apollonius left Alexandria, probably in consequence of this quarrel, and took up his residence at Rhodes: he was at last recalled to his native country to occupy the place of the learned Eratósthenes.

Of all his works only one poem remains, entitled 'Argonautica,' in four books, containing 5835 verses, the subject of which is the adventure of the Argonauts. In the opinion of Quintilian (x. 1, 54) the poem possesses considerable merit, but is deficient in true poetic spirit. (Longinus, 'On the Sublime,' xxxii.) Apollonius does not possess the qualities which constitute a great

poet: he impedes the narrative with a minute and superfluous detail of circumstances till the reader's patience is fairly worn out. He has been most successful in his treatment of the tender passions: nothing can be more beautiful than the manner in which he paints the gradual progress of Medea's love for Jason. In this he is not surpassed by Virgil, who is said by Macrobius ('Saturn.' v. 17) to have borrowed his idea of Dido's love for Æneas from the poem of Apollonius.

The Latin poet Valerius Flaccus closely imitated Apollonius in his work, also entitled 'Argonautica.' The first edition of this work was published at Florence, 1496. A. Wellauer published an edition at Leipzig, 1828, 2 vols. 8vo. It has been translated into English by Green, Fawkes (1797), and Preston (1803); into Italian by Flangini (Roma, 1791); into German by Bodmer (Zürich, 1779); and into French by Caussin (1797).

APOLLO'NIUS, the Sophist, supposed to have lived at Alexandria in the time of Augustus, is the author of a Lexicon of Homeric words, entitled Λέξεις Ὁμηρικαί. It was first published by Villoison at Paris, in 1773, in two vols. 4to., accompanied by a commentary and prolegomena. The work was reprinted at Leiden in 1788, 8vo., with notes by Tollius, but with the omission of Villoison's Latin translation and prolegomena.

APOLLO'NIUS OF TYANA was born, at the commencement of the Christian æra, in Tyana, a town of Cappadocia. At the age of fourteen, his father, Apollonius, sent him to Tarsus, to study grammar and rhetoric. Dissatisfied with the luxury of the citizens, Apollonius retired to Ægæ (Ayas), a town near Tarsus, where he became acquainted with the doctrines of various philosophers. Apollonius observed the Pythagorean rules strictly, took up his abode in the temple of Æsculapius at Ægæ, famous for miraculous cures, abstained from animal food and wine, lived upon fruits and herbs, walked barefoot, and let his hair and beard grow. The priests initiated him in their mysteries, and said that Æsculapius himself rejoiced at having Apollonius a witness of his cures. Having finished his studies at Ægæ, Apollonius travelled by land to India. At Nineveh he met with Damis, who became his travelling companion. On his road to India he visited Babylon; and in India he saw many wonderful things, and conversed with the gymnosophists, who showed him that the wisdom of Pythágoras came from their country. On his return to Asia Minor, he prophesied, and performed many miracles. He afterwards went to Crete; and in the reign of Nero he arrived at Rome. When Nero left Rome for Greece, he ordered all foreign philosophers to quit the city. Apollonius now rambled about in many countries: he visited Spain, Athens, Egypt, and Ethiopia. In Egypt he joined Vespasian, who probably found it politic to gain a man whose sanctity and miracles had raised him to the rank of a deity; for during his lifetime, and still more after his death, Apollonius enjoyed this distinction, and was sometimes ranked with Jesus Christ. ('Life of Alexander Severus,' by Lampridius, cap. 29.) He died, eighty, or ninety, or one hundred, or one hundred and seventeen years old, either at Ephesus, or at Lindus in the temple of Pallas. The history of Apollonius is contained in his life by Philostratus. The first two books exist in an English translation by Charles Blount, Lond. 1680, fol. In 1693, this translation was suppressed on account of the annotations being hostile to Christianity, and Blount committed suicide. Philostratus wrote the Greek original by order, and from the information of Julia Domna, the wife of Septimius Severus, who died, A.D. 217. The empress had obtained possession of the account which Damis had formerly given to a relative.

Apollonius is not mentioned by any writer earlier than Apuleius and Lucian. Philostratus wrote his account of Apollonius about a century after the wise man's death. A passage in the 'Life of Aurelian' (chap. 24), by Vopiscus, shows that the fame of Apollonius was even then firmly established, and that temples and statues still existed in honour of this 'true friend of the gods,' as the credulous historian calls him.

APOLLO'NIUS DY'SCOLUS, or ALEXANDRI'NUS MINOR, a Greek grammarian, who was born at Alexandria in the second century of the Christian æra. He is said to have been so poor that he was unable even to purchase paper. The origin of his name, Dyscolus, which may mean 'morose,' is uncertain. Of his four remaining works the chief is a 'Treatise on Syntax,' in four books, the first edition of which is by Aldus, 1495, Venice. An improved edition was made by Sylburgius, with a Latin translation of Æm. Portus, 1590; the last is by Bekker, Berlin, 1817. There is also a work attributed to him, 'Wonderful Stories,' the best edition of which is by Meursius, Leiden. 1620. It has been published also by Teucher, Leipzig, 1792.

APOLOGIES OF THE FATHERS are writings in defence of Christianity, composed from the beginning of the second to the sixth century. The fathers of the church, with the view of refuting the doctrines of heathenism and the false accusations against the followers of Jesus, composed 'Apologies,' which were partly addressed to heathens, partly written on particular occasions, and addressed to emperors, in order to convince them of the injustice and folly of persecution.

Justinus Martyr describes, in two apologies, how he sought for truth in various systems of philosophy until he found it in the Gospel. In his dialogue with the Jew Tryphon, Justinus Martyr appeals to the prophecies of the Old Testament. Athenagoras defended the Christians against the charge of atheism, incest, infanticide, and other abominations with which they were charged. Tatianus, Theophilus of Antioch, and Hermas, proved the absurdity of paganism and the contradictions of philosophers, in order to show the necessity of revelation.

After these Greek apologists of the second century followed, among the Latins, Tertullian, who, in his 'Apologeticus,' shows how the faith and holiness of Christians were manifested under persecutions; and Minucius Felix, who, in his eloquent dialogue, 'Octavius,' introduces the repre-

sentatives of various parties, whose arguments are overcome by the truth of the Gospel. Cyprian wrote 'On the Absurdity of Idolatry.' These apologists of the second century did not defend the systems of certain schools, but only the truth of Christianity.

In the fifth century the doctrines of the Gospel were systematized by Origen among the Greeks, and Arnobius among the Latins, in order to defend them against the attacks of Celsus, Porphyrius, Hierocles, and Julian, which were directed not only against the morals of the Christians, but also against their history and their doctrines. The greatest apologist among the fathers is Eusebius, whose historical and chronological works have an apologetical tendency; his 'Evangelical Preparation' contains, in fifteen books, the introduction to his 'Evangelical Demonstration,' in twenty books. The first ten books of this work are still extant, in which he demonstrates the harmony of the Old with the New Testament, the moral dignity of Jesus, the sublimity of his plan, the rectitude of his disciples, and the absurdity of those who ascribed another plan to the disciples than that which they professedly followed. Eusebius examines, in a little publication against Hierocles, the life of Apollonius of Tyana by Philostratus, and shows the contradictions of the biographer, and how the performances of Apollonius differed from the miracles of Christ. The works of Athanasius and Chrysostomus contain apologetical materials. Cyrillus of Alexandria wrote ten books in reply to the Emperor Julian. Theodoret wrote twelve sermons, in which he gathers the arguments for Christian truth from the writings of the heathens, and compares the Greek philosophers with Moses, the prophets, and the apostles. The most important apologetical works among the Latins are the seven books of Arnobius, 'Against the Heathen;' the seven books of Lactantius; the twenty-two books of St. Augustin, 'On the City of God;' the catalogue of St. Jerome, by which he refutes the objection that no distinguished individuals embraced the Gospel; and, finally, 'The History of Orosius,' in which he refutes the assertion that plague, famine, earthquakes, and other horrible events were consequences of the Gospel.

The following translations and editions will be interesting to English readers. Justin the philosopher, commonly called Justin Martyr, died about A.D. 165. His 'Apologia Prima pro Christianis,' was published by Dr. Grabe, Oxon., 1700, 'Apologia Secunda,' by Hutchinson, Oxon., 1703; Justin Martyr's 'Full Account of the Christian Worship, Baptism, and the Lord's Supper,' with Notes of Dr. Grabe and Mr. Whiston; 'Dialogus cum Tryphone Judæo,' London, 1722, 8vo.; 'The Apologies of Justin M., Tertullian, and M. Felix, with the Commentary of Vincentius Lirinensis,' by Reeves, 1709 and 1716—an unfaithful translation; 'The Dialogue with the Jew,' by Brown, London, 1755, is an excellent translation, and very scarce in the book-market. Minucius Felix, of the third century, author of 'A Dialogue between Cæcilius, a Heathen, and Octavius, a Christian,' is well translated by Sir David Dalrymple.

APOLOGUE, synonymous with fable (ἀπόλογος, *fabula*, fable), 'a novel story contrived to teach some moral truth.' (Johnson.) 'It would be a high relief . . to hear an *apologue*, or fable, well told, and with such humour as to need no sententious moral at the end to make the application.' (Shaftesbury, 'Charact.' vol. iii., 'Miscell.' iv. c. 1.) It is essential to an apologue that the circumstances told in it should be fictitious. Some have gone so far as to say that they must involve an impossibility, as in Æsop's 'Fables,' where we find beasts and inanimate things made to think and speak.

APO'LOGY (ἀπολογία), a Greek word, originally signifying a defence made in a court of justice by or for a person accused. There is extant a small piece attributed to Xenophon, entitled the 'Apology of Socrates,' and another with the same title by Plato. The word apology was adopted by the Christian fathers. [APOLOGIES.] At the present day it is only used in ordinary language in one sense, that 'of asking pardon or excuse for some offence.' But the word has occasionally been used in the early Christian sense, as by Bishop Watson in his treatise entitled an 'Apology for the Bible,' and by Barclay in his 'Apology for the Quakers.'

APOPHTHEGM (ἀπόφθεγμα), a Greek word signifying 'a thing spoken out,' and in its more technical sense, a pithy saying calculated to arrest the attention. 'Certainly apophthegms are of excellent use. Cicero prettily called them *salinas*, salt-pits, that you may extract salt out of and sprinkle it where you will. They serve to be interlaced in continued speech; they serve if you take out the kernel of them and make them your own.' (Bacon.)

The following are examples of apophthegms:—'Bigotry murders Religion, to frighten fools with her ghost.' (Colton's 'Lacon.') 'We ask advice, but we mean approbation.' ('Lacon.') Plutarch made a collection entitled 'The Apophthegms of Kings and Generals,' and dedicated it to the Emperor Trajan. Many of these apophthegms would be classed in modern times among anecdotes.

The Lacedæmonians were noted for affecting the apophthegmatic mode of speech; and Plutarch has collected their sentences also, under the title of 'Laconica.'

APO'PHYGE, a term applied by architects generally to a concave surface lying between or connecting two flat surfaces not in the same plane, and particularly to a slight concavity which is almost invariably found to terminate the shaft of an Ionic or Corinthian column both above and below — immediately above the uppermost fillet of the congeries of mouldings called the base, and under the moulding or mouldings of the hypotrachelium, or necking. In the latter case the apophyge is distinguished in the two positions as the lower and the upper. The more familiar English term for the same thing is, the *escape*; and in French, the apophyge is termed the *congé*. Apophyge is from a compound Greek word signifying a *flying off*.

APOPHYLLIC ACID is obtained from *co-*

tarnina (an organic alkali). It crystallizes with or without water; in the latter case the crystals have the form of rhombic octahedrons, which are colourless. It has a slightly acid and astringent taste; it reddens litmus-paper, and it is insoluble in alcohol and in ether. The salts which it forms with bases are soluble. It forms a detonating compound with oxide of silver.

APOPHYLLITE, a crystallized mineral, belonging to the *Zeolite* group. Its fundamental form is the square prism, but it often assumes other forms. It is greyish white, translucent, and about as hard as apatite. It is a hydrated silicate of potash and lime. It occurs in the mines of magnetic iron-ore of Sweden and Norway, in the lead mines of the Harz mountains, in the cavities of several basaltic rocks at Marienberg in Bohemia, at Fossa in the Tyrol, in the Isle of Skye, &c.

APOPLEXY, from ἀποπληξία, 'a sudden blow,' a deprivation of power and motion, &c. *Morbus attonitus, sideratio, percussio*, &c., are synonymous terms. In the animal body two sets of functions perfectly distinct from each other are combined, the Organic and the Animal; the organic include the various functions by which the structure of the body is built up and its integrity maintained, and the animal include the functions of sensation and voluntary motion. [LIFE.] The disease termed apoplexy is an affection of the animal functions, the organic remaining comparatively unimpaired. It is the loss of sensation and voluntary motion, while respiration, circulation, secretion, and the other functions of the organic life continue to be performed, though not indeed without more or less disorder.

Of all the diseases to which the human body is subject, there is none which is commonly conceived to attack so suddenly, and to kill so rapidly. What is usually called the attack is indeed sudden; but the disease itself, so far from being sudden, is generally even slow in its progress, giving distinct and repeated indications of its presence and of its course. The signs by which the apoplectic constitution is denoted, the Premonitory Signs of the disease as they are termed, it is of the utmost importance to observe, because judicious measures adopted at this stage will almost always avert an attack, or render an attack mild which would otherwise have been mortal. There are few other diseases over which both the physician and the patient have so much control: the patient by the general management of himself, in removing the constitutional predisposition to it; and the physician by active remedies when the attack is instant, in effecting what the general management may have proved inadequate to accomplish.

The *premonitory symptoms* are drowsiness, giddiness, frequent yawning, dulness of hearing, disordered vision, motes or sparks before the eyes, pain in the head, and immediately preceding the attack various symptoms of paralysis. These symptoms may occur together or separately, and by attention to them an attack of apoplexy may often be warded off.

With regard to the attack itself, the phenomena are different according to its intensity. There are indeed various modes or forms of the disease which are mainly matters of degree; nevertheless these diversities are not only very striking in their own nature, but in a practical point of view are highly important, because the remedies appropriate to the one are not suited to the other, at least without such modifications as, in point of fact, to render them different remedies.

For all practical purposes it is sufficient to comprehend the various forms of the disease under four heads:—first, that in which the attack is sudden and violent; secondly, that in which the attack is comparatively slight at the commencement, but progressively increases in severity; thirdly, that in which the attack commences with apoplexy and terminates in paralysis; and, fourthly, that in which the attack commences with paralysis and terminates in apoplexy.

The causes of the disease are either predisposing or exciting. The *predisposing causes* are, 1, Sex. It is decidedly more common in the male than in the female, because the male is more exposed to the exciting causes, and nothing so surely generates a predisposition to the disease as the long-continued operation of an exciting cause. 2, Age. It may occur in childhood and youth: it is indeed rare in the former, but it is not uncommon in the latter; still, however, the great majority of cases without doubt occur at the more advanced stages of life. The period commonly conceived to be that in which it most frequently occurs, is the interval between forty and seventy. Out of sixty-three cases, two were between twenty and thirty years of age; eight from thirty to forty; seven from forty to fifty; ten from fifty to sixty; twenty-three from sixty to seventy; twelve from seventy to eighty; and one from eighty to ninety. 3, Conformation of the Body. The large head, short neck, full chest, and sanguine and plethoric temperament, have from time immemorial been considered as forming the apoplectic constitution, and though the disease may and often does occur in the very opposite states of the system, yet there cannot be a question that the conformation of the body just described is peculiarly favourable to the formation of that pathological condition of the brain on which, as we have seen, the malady depends. 4, Mode of Life. Luxurious living, especially combined with sedentary habits, is a most powerful predisposing cause. 5, Suppression of Accustomed Evacuations, as the suppression of the piles, or of discharges from the skin, whether from the sudden disappearance of eruptions, the result of natural disease, or the drying up of a seton or issue. 6, Mental States. Violent emotion: cases continually occur in which persons drop down suddenly in a fit in a paroxysm of anger. Long-continued anxiety is almost as powerful an exciting cause as luxurious living. It is the common opinion that the studious are more prone to this disease than other classes; but this notion is ill founded, for the evidence is complete that moderate intellectual labour is not only in a high degree conservative of the general health, but that it is more especially preventive of that peculiar condition of the brain on which apoplexy depends. The condition of all others most con-

ducive to apoplexy is that in which at a somewhat advanced age the food habitually taken is large in quantity and rich and stimulating in quality, at the same time that the intellectual faculties are little excited; while the history of lawyers, judges, and philosophers, would indicate a remarkable exemption from this disease in all its forms.

Among the most powerful *exciting causes* are intemperance in eating and drinking, violent emotions of mind, whatever determines the blood with undue impetus to the brain or impedes its return from it, such as great muscular exertion, dependent posture of the head, tight ligatures, and the like.

Both sets of causes, the predisposing and the exciting, bring about a paroxysm, either by diminishing the vital energy of the brain or by producing undue pressure on its substance.

Treatment.—The treatment of this disease must obviously vary with the pathological condition of the brain on which it depends. The skill of the physician consists in detecting what that pathological condition is, and in exactly adapting his remedies to it, which must differ widely according as he is called to treat a threatening or an actual paroxysm, or to prescribe for a patient subsequent to an attack. The state both of the brain and of the system varies in every individual case, and the treatment ought in every case to be modified accordingly. It is only necessary to add here, that whenever a person is seized with a fit of apoplexy, he should be carried into a large room, the freest possible circulation of fresh air should be promoted around the body, which should be placed in the horizontal posture, with the head, however, considerably raised, all bandages should be taken from about the head and neck, and especially from about the neck; and a medical man should be sent for instantly. Every observer of such a case should bear in mind that the loss of life may be the consequence of the loss of a minute.

A POSTERIO'RI. [A PRIORI and A POSTERIORI.]

APOSTA'SIAS. [VEGETABLE MORPHOLOGY.]

APOSTLES (messengers, ambassadors, from the Greek ἀπόστολος) were, according to Luke vi. 13, those twelve disciples whom Jesus chose from the number of his followers to be his companions, and whom he commissioned to preach his doctrines, first among the Jews only (Matt. x. 5; Luke ix. 2), and after his resurrection to the Gentiles also (Matt. xxviii. 19; Mark xvi. 15). Jesus said concerning apostles, 'As my Father hath sent me, even so send I you. He breathed on them and said, Receive the Holy Ghost. Whosesoever sins ye remit, they are remitted unto them, and whosesoever sins ye retain, they are retained.' (John xx. 21-23.) The list of the apostles occurs in Matt. x. 2; Mark iii. 16, &c.; Luke vi. 14, &c. The names of the apostles are, 'Simon, who is called Peter, and Andrew, his brother; James, the son of Zebedee, and John, his brother; Philip and Bartholomew; Thomas, and Matthew, the publican; James, the son of Alpheus; and Lebbeus, whose surname was Thaddeus Simon, the Cananite; and Judas Iscariot, who also betrayed him.' After the death of Judas Iscariot, one hundred and twenty disciples being assembled, Peter recommended the choice of another apostle. 'Of these men which have companied with us all the time that the Lord Jesus went in and out among us, beginning from the baptism of John, unto that same day that he was taken up from us, must one be ordained to be a witness with us of his resurrection. And they appointed two, Joseph, called Barsabas, who was surnamed Justus, and Matthias. And they prayed, Thou, Lord, which knowest the hearts of all men, show whether of these two thou hast chosen, that he may take part of this ministry and apostleship, from which Judas by transgression fell, that he might go to his own place. And they gave forth their lots; and the lot fell upon Matthias, and he was numbered with the eleven apostles' (Acts i. 15-26). To these twelve apostles was afterwards added Saul, whose name among the Greeks was Paul, called to be an apostle of the Gentiles through the will of God. (Gal. i. 1; Col. i. 1; Rom. xi. 13; Acts ix.) By the instrumentality of St. Paul the Gospel was most effectually propagated. Barnabas (Acts xiv. 14) being an apostolic missionary is mentioned in the following manner: 'And when the *apostles* Barnabas and Paul heard,' &c. From this passage we infer that the title *apostle* was not exclusively given to the immediate disciples of Jesus. (Comp. Acts xiv. 4; Rom. xvi. 7.)

APOSTLES, ACTS OF THE. This book constitutes the second part of the Gospel according to St. Luke, which he dedicated to Theophilus (Luke i. 1; Acts i. 1). The Acts belong to the 'Homologoumena,' or those canonical books which were, by all parties, recognized as genuine. (Euseb: 'Hist. Ecclesiastica,' iii. 25.) The time at which St. Luke wrote the Acts may be gathered from the following circumstances. The arrival of St. Paul in Rome took place in the spring of about the year A.D. 63. Since this arrival is mentioned in the Acts, they must have been written after the year 63; and since the death of St. Paul, about the year 68 or 69, is not mentioned by St. Luke, the Acts were probably composed and circulated before this date. Theophilus, to whom the Acts were dedicated, may be considered as the representative of the inquiring heathen; consequently, it was proper that the Acts should be written, as they are, in the Greek language.

APOSTOLIC FATHERS are those teachers of the Christian church who distinguished themselves during the first two centuries, and derived their Christian knowledge from personal acquaintance with the apostles.

APOSTO'LICI, were imitators of the apostolic life mentioned by Epiphanius ('Hæres.' 67). In the middle ages they were called Cathari. A sect called Apostolic Brothers were very numerous on the banks of the Lower Rhine, about the middle of the twelfth century. We learn from a letter written A.D. 1146, in which Everwin, ecclesiastical provost of Steinfelden, exhorts St. Bernhard of Clairvaux to confute these heretics, that they

rejected oaths, infant baptism, fasts, ceremonies, worship of saints, purgatory, masses, second marriages, the power of the pope, &c. Some of them were brought before the ecclesiastical court of the Archbishop of Cologne, and defended themselves by biblical quotations. After a disputation of three days, being still unconverted, the people dragged them to the flames. Another apostolic brotherhood was founded by Gerhard Segarelli of Parma about A.D. 1260, and continued under various leaders to defy the authority of the church for half a century. These Apostolici rejected the authority of the pope, oaths, capital punishments, &c.

APOSTROPHE (ἀποστροφή), 'a turning away,' or 'a sudden change in our discourse, when, without giving previous notice, we address ourselves to a person or thing different from that to which we were addressing ourselves before.' (Beattie, 'Elements of Moral Science.') The term is also used, less properly, for an address to some absent or inanimate object, as in 'Julius Cæsar,' Act iii. Sc. 1. :—

> O pardon me, thou bleeding piece of earth,
> That I am meek and gentle with these butchers.

It is also used to express the contraction or elision of part of a word, as *boro'* for *borough*, *learn'd* for *learned*. The comma, by which the final *s* of the genitive case is separated from the word, is also called an apostrophe, as in 'Israel's monarch.'

APOTHECARIES, COMPANY OF, one of the incorporated companies of the city of London.

The word Apothecary is from the French *apothicaire*, which is defined by Richelet to be 'one who prepares medicines according to a physician's prescription.' The word is from the low Latin *apothecarius*, and that is from the genuine Latin *apotheca*, which means a store-house or store-room generally, and, more particularly, a place for storing wine in: the Latin word is, however, from the Greek (ἀποθήκη).

In England, in former times, an apothecary appears to have been the common name for a general practitioner of medicine, a part of whose business it was, probably in all cases, to keep a shop for the sale of medicines. In 1345, a person of the name of Coursus de Gangeland, on whom Edward III. then settled a pension of sixpence a day for life, for his attendance on his Majesty some time before while he lay sick in Scotland, is called in the grant, printed in Rymer's 'Fœdera,' an apothecary of London. But at this date, and for a long time after, the profession of physic was entirely unregulated.

It was not till after the accession of Henry VIII. that the different branches of the profession came to be distinguished, and that each had its province and particular privileges assigned to it by law.

In 1511 an act of parliament (3 Hen. VIII. c. 11) was passed, by which it was ordered that no one should practise as surgeon or physician in the city of London, or within seven miles of it, until he had been first examined, approved, and admitted by the Bishop of London or the Dean of St. Paul's, who were to call in to assist them in the examination 'four doctors of physic and of surgery, other expert persons in that faculty.' In 1518 the physicians were for the first time incorporated, and their college founded, evidently with the view that it should exercise a general superintendence over all the branches of the profession. In 1540 the surgeons were also incorporated and united, as they continued to be till the beginning of the present century, with the barbers.

It was found necessary, in 1543, to pass an act (34 and 35 Hen. VIII. c. 8) for the toleration and protection of the numerous irregular practitioners, who did not belong to either body, but who probably formed the ordinary professors of healing throughout the kingdom. The import of the enactment is expressed in its title, which is, 'An Act that persons being no common surgeons may minister outward medicines.' The persons thus tolerated in the administration of outward medicines, of course comprehended those who kept shops for the sale of drugs, to whom the name of apothecaries was now exclusively applied. The acceptation of the name, as thus confined, may be gathered from Shakspere's delineation of the apothecary in 'Romeo and Juliet' (published in 1597), as one who kept a shop, and who was resorted to as a dealer in all sorts of chemical preparations. Nothing is said of his practising medicine; and it certainly was not till nearly a century later that apothecaries in England, as distinguished from physicians and surgeons, began regularly to act as general practitioners.

Meanwhile, however, the apothecaries of London were incorporated by James I. on the 9th of April, 1606, and united with the Company of Grocers. They remained thus united till the 6th of December, 1617, when they received a new charter, by which they were formed into a separate company, under the designation of the 'Master, Wardens, and Society of the Art and Mystery of Apothecaries of the city of London.' This charter ordains that no grocer shall keep an apothecary's shop; that every apothecary shall have served an apprenticeship of seven years; and before he is permitted to keep a shop, or to act as an apothecary, he shall be examined before the master and wardens to ascertain his fitness. It also gave the company extensive powers to search for and destroy in the city of London, or within seven miles, compounds and drugs which were adulterated or unfit for medical use. This is the charter which still constitutes them one of the city companies, although various subsequent acts of parliament have materially changed the character of the society.

It appears to have been only a few years before the close of the seventeenth century that the apothecaries, at least in London and its neighbourhood, began gradually to prescribe as well as to dispense medicines. Addison, in the 'Spectator,' No. 195, published in 1711, speaks of the apothecaries as the common medical attendants of the sick, and as performing the functions both of physician and surgeon. This encroachment was strongly resisted by the College of Physicians, who, by way of retaliation, established a dispen-

sary for the sale of medicines to the poor at prime cost at their hall in Warwick Lane.

The apothecaries themselves contended at this time for permission to practise as medical advisers and attendants only so far as circumstances seemed to render it indispensable. In a clever tract written in their defence, published in 1724, and apparently the production of one of themselves, entitled 'Pharmacopolæ Justificati; or, the Apothecaries vindicated from the Imputation of Ignorance,' &c., the following opinion is expressed (p. 31):—'As to apothecaries practising, the miserable state of the sick poor, till some other provision is made for their relief, seems sufficiently to warrant it, so long as it is confined to them.'

It has been often stated that the dealers in medicines called chemists or druggists first made their appearance about the end of the last century. As they soon began to prescribe, as well as to dispense, the rivalry with which they were thus met was as eagerly opposed by the regular apothecaries as their own encroachments had in the first instance been by the physicians. It is to be doubted, however, if the first appearance of these interlopers was so recent as has been assumed. In a tract, printed on a single folio leaf, 'at the Star in Bow Lane in 1683,' entitled 'A Plea for the Chemists or Non-Collegiats,' the author, Nat Merry, stoutly defends the right of the manufacturers of chemical preparations to administer medicines, against the objections of the Apothecaries' Company, who seem to have been themselves at this time only beginning to act as general practitioners. And in 1708 we find a series of resolutions published by the Court of Apothecaries, in which they complain of the intrusion into their business of foreigners—that is, of persons not free of the company. Their charter, though it appeared to bestow upon them somewhat extensive privileges, had been found nearly inoperative from the omission of any means of executing its provisions, and of any penalties for their infringement. In 1722, therefore, an act of parliament was obtained by the company, giving them the right of visiting all shops in which medicinal preparations were sold in London, or within seven miles of it, and of destroying such drugs as they might find unfit for use. This act expired in 1729; and although an attempt was made to obtain a renewal of it, the application was not persevered in. But in 1748 another act was passed, empowering the society to appoint ten of their members to form a court of examiners, without whose licence no one should be allowed to sell medicines in London, or within seven miles of it. This act probably had the effect of putting the unlicensed dealers down; which may account for the common statement that no such description of dealers ever made their appearance till a comparatively recent period.

Up to within the last few years the Company of Apothecaries had never attempted to extend their authority beyond the metropolis and its immediate neighbourhood. But in 1815 an act was passed (55 Geo. III. c. 194) which placed the society in a new position, by giving to a Court of

Examiners, composed of twelve members, who must be apothecaries, the sole right of examining and licensing apothecaries throughout England and Wales. The examiners must be apothecaries who have been in practice for not less than ten years. They are appointed by the master, wardens, and assistants of the company. The master and wardens, or the Court of Examiners, may appoint five apothecaries in any county in England above thirty miles from London, who are empowered to examine and license apothecaries' assistants. The power of searching for adulterated drugs given by the charter was repealed by the above act, and in lieu thereof the master, wardens, or assistants, or the examiners, or any two of them, are empowered to enter the shops of apothecaries in any part of England and Wales, and to search, survey, and prove medicines, and to destroy the same; and also to impose fines on the offenders, of 5*l.*, 10*l.*, and 15*l.* for the first, second, and third offences, half of which goes to the informers and half to the company. From twelve to twenty members are employed annually, in parties of two each, in suitable divisions, to conduct the searches. They sometimes destroy drugs and medicines in pursuance of their powers; but it is more usual to direct the clerk to send letters to each defaulter, directing them to supply themselves with drugs of good quality. The pecuniary advantages which the company derive from this act are not large enough to allow them to carry on the searches on a very extensive scale. The act also empowers the Company of Apothecaries to prosecute persons who unlawfully exercise the functions of an apothecary. It is a subject of complaint with the company that the machinery for accomplishing this object is very imperfect. The punishment for the offence is a penalty recoverable only by action of debt, which must be tried at the assizes for the county in which the offence is committed. As it is of importance that prosecutions instituted by a public body should not fail, the society are not in the habit of instituting frequent prosecutions. In only one case have they failed. The expenses of prosecutions are very great, six recent actions having cost 320*l.* each. ('Statement,' &c., May, 1844.) From the small number of prosecutions, owing to the want of a more summary process, it is stated that 'the number of unqualified persons who are engaged in practice is very considerable.' The act of 1815 provided that, after the 1st of August in that year, no person not licensed should practise as an apothecary, except such only as were already in practice. It is required by the act that candidates for examination should have attained the age of twenty-one, and have served an apprenticeship of at least five years with an apothecary legally qualified to practice; and they are also required to produce testimonials of good moral conduct, and of a sufficient medical education. During the progress of the bill through parliament, the opposition of the chemists and druggists rendered it necessary to introduce a clause which exempted that class of dealers altogether from its operation.

From the circumstance that in country places, with very few exceptions, no person can practise

medicine without keeping a supply of drugs for the use of his patients, or in other words, acting as an apothecary, this statute has given to the Company of Apothecaries control over the medical profession throughout England. Every general practitioner must not only have obtained his certificate, but must have served an apprenticeship of five years with a licentiate of the company. The payment required by the act of parliament for a licence to practise in London, or within ten miles of it, is ten guineas; in any other part of the country, six guineas: and the licence to practise as an assistant is two guineas. The penalty for practising without this licence is 20*l*. It is declared in the act that the society may appropriate the moneys which they thus receive in any way they may deem expedient.

Before the act of 1815 came into operation, a large proportion of the medical practitioners in country places in England were graduates of the universities of Edinburgh, Glasgow, and Dublin, or licentiates of the Royal Colleges of Surgeons of these cities, or of that of London; but the state of medical education generally was at that period very defective. The London College of Surgeons required no medical examination whatever, and twelve months only of surgical study. Persons thus qualified are admitted as surgeons in the army and navy, and into the service of the East India Company, after an additional examination by their respective boards; but they are not allowed to act as apothecaries in England.

The instructions issued by the Court of Examiners, dated 31st July, 1815 (the day previous to the new act coming into operation), require evidence from candidates for the licence of the company of having served an apprenticeship of five years, also testimonials of good moral character, and of having attained the age of twenty-one years. The course of lectures prescribed was:—One course of lectures on chemistry, one on materia medica, two on anatomy and physiology, two on the theory and practice of medicine; six months' attendance on the medical practice of an hospital, infirmary, or dispensary. The examination consisted:—1, In translating parts of the 'Pharmacopœia Londinensis' and physicians' prescriptions. 2, In the theory and practice of medicine. 3, In pharmaceutical chemistry. 4, In the materia medica. In September, 1827, and subsequently in September, 1828, and October, 1830, considerable additions were made to this course, by increasing the number of lectures, by the introduction of the subjects of botany, midwifery, the diseases of women and children, forensic medicine, and morbid anatomy, and by extending the period of attendance on hospital practice, first to nine months, and in the last-mentioned year to twelve months.

In April, 1835, the Court of Examiners issued new regulations (which are those now in use) for raising still higher the qualifications of candidates for the licence of the company. Every candidate whose attendance on lectures commenced on or after the 1st of October, 1835, must have attended the following lectures and medical practice during not less than three winter and two summer sessions: each winter session to consist of not less than six months, and to commence not sooner than the first nor later than the 15th October; and each summer session to extend from the 1st of May to the 31st of July.

First Winter Session.—Chemistry. Anatomy and physiology. Anatomical demonstrations. Materia medica and therapeutics; this course may be divided into two parts of fifty lectures each, one of which may be attended in the summer.

First Summer Session.—Botany and vegetable physiology; either before or after the first winter session.

Second Winter Session.—Anatomy and physiology. Anatomical demonstrations. Dissections. Principles and practice of medicine.

Second Summer Session.—Forensic medicine.

Third Winter Session.—Dissections. Principles and practice of medicine.

Midwifery, and the diseases of women and children, two courses, in separate sessions, and subsequent to the termination of the first winter session. Practical midwifery, at any time after the conclusion of the first course of midwifery lectures. Medical practice during the full term of eighteen months, from or after the commencement of the second winter session; twelve months at a recognized hospital, and six months at a recognized hospital or a recognized dispensary: in connection with the hospital attendance, a course of clinical lectures, and instruction in morbid anatomy, will be required.

The above course of study may be extended over a longer period than three winter and two summer sessions, provided the lectures and medical practice are attended in the prescribed order and in the required sessions. The examinations of the candidate for the certificate are as follows:—In translating portions of the first four books of Celsus 'De Medicinâ,' and of the first twenty-three chapters of Gregory's 'Conspectus Medicinæ Theoreticæ;' in physicians' prescriptions, and the 'Pharmacopœia Londinensis;' in chemistry; in materia medica and therapeutics; in botany; in anatomy and physiology; in the principles and practice of medicine. This branch of the examination embraces an inquiry into the pregnant and puerperal states; and also into the diseases of children.

In the 'Statement' issued by the Company of Apothecaries in May, 1844, they say:—'The increased number of medical students attending lectures in conformity with the regulations led to the increase of medical teachers, and not only did new schools spring up in the metropolis, but, under the auspices of the Court of Examiners, public schools of medicine were organized in the provinces: and at the present day Manchester, Liverpool, Birmingham, Leeds, Bristol, Hull, Sheffield, Newcastle, and York, have each their public school, at which the student may pursue and *complete* his medical education.' It is added that 'no mean proportion of those whose examination has given evidence of the highest professional attainment have been pupils of the provincial schools.' The influence of the regulations of the Court of Examiners on the medical profession is

very great. The opinion of very eminent members of the medical profession before a select committee of the House of Commons in 1834, as to the manner in which the Apothecaries' Company had performed the duties devolving upon them as an examining body, is decided in its approbation.

The Apothecaries' Company, in their interpretation of the clause which requires five years' apprenticeship to an apothecary, have considered that 'every candidate who has been an apprentice for the length of time directed by the act, is entitled to be examined, provided the person to whom he was an apprentice was legally qualified to practise as an apothecary according to the laws in force in that kingdom or particular district in which he resided; and in accordance with this interpretation, hundreds of candidates have been admitted to examination who have served their apprenticeships in Scotland and Ireland, as well as many from America and the British Colonies.' ('Reply,' &c. p. 3.)

The Apothecaries' Company ranks the fifty-eighth in the list of city companies. The freedom of the company is acquired by patrimony, freedom, and redemption. Freedom by patrimony may be acquired by persons not apothecaries. The charter requires that all persons practising as apothecaries in the city of London should belong to the company; but this rule is not enforced. Apprentices to apothecaries must be bound at the Company's Hall, after an examination by the master and wardens as to their proficiency in Latin. The members of the society are exempted by statute from serving ward and parish offices. The income of the company is under 2000*l.* a year. Their arms are, azure, Apollo, in his glory, holding in his left hand a bow, in his right an arrow, bestriding the serpent Python; supporters, two unicorns; crest, a rhinoceros, all *or*; motto, *Opiferque per orbem dicor*. They have a hall, with very extensive laboratories, warehouses, &c., in Water Lane, Blackfriars, where medicines are sold to the public; and where, since the reign of Queen Anne, all the medicines are prepared that are used in the army and navy. The freemen of the company who are what is termed proprietors of stock, have the privilege of becoming participators in the profits arising from the sale of medicines. The concern is regulated by a committee of thirty members. The dispensary was established in 1623; and the laboratories by subscription among the members of the company in 1671. The company also possesses a garden, of above three acres in extent, at Chelsea, in which exotic plants are cultivated, and to which every medical student in London is admitted. The garden is kept up at a considerable expense out of the funds of the company, assisted at various times by liberal contributions of the members. Connected with the garden is the office of Botanical Demonstrator, who is appointed by the court. He gives gratuitous lectures at the garden twice a week from May to September, to the apprentices of freemen of the company, and to the pupils of all botanical teachers who apply for admission at the garden. The society gives every year a gold and a silver medal and books as prizes to the best-informed students in materia medica who have attended their garden. The apprentices of members of the society are not permitted to contend with other candidates for these prizes.

(*Political Dictionary.*)

APOTHE'CIA (from the Greek ἀποθήκη, 'a case,' 'a repository'), in Botany, a name given to some of the organs of reproduction in Cryptogamia. In lichens the reproductive matter appears on the surface of its frond or thallus in two forms. First, in the form of little coloured cups or lines with a hard disk surrounded by a rim, and containing tubes filled with sporules; and secondly, in the form of little heaps of pulverulent matter, which are scattered over the surface of the thallus. These last are called *soredia*; the first, *apothecia*. These organs form the principal means of distinguishing the various forms of lichens, and consequently it has been found convenient to indicate minor points in their structure by other names. Thus the apothecium, which in English is called a *shield*, has various names according to its form: *scutellum* is a shield with an elevated rim; *pelta*, a flat shield; *tuberculum*, a convex shield; *trica* or *gyroma*, a furrowed shield; *lirella*, a linear shield; *globulus*, a round deciduous shield; *pilidium*, an orbicular hemispherical shield. The parts of the apothecium or shield have also obtained distinct names: thus *perithecium* is the inside of the shield, in which the sporules are immersed; *hypothesium* is the substance that surrounds or overlies the perithecium; *nucleus* is the disk of the shield, which contains the sporules and their cases; and *asci* are the tubes in which the sporules are contained.

Apothecia is also the name given to the cases in which the organs of reproduction of many of the Algæ are contained. The reproductive granules contained in the apothecia of both lichens and algæ are called by some writers *gongyli*.

APOTHEO'SIS (ἀποθίωσις, a deification, literally, a god-making), the enrolment of a mortal among the gods. The mythology of Greece is full of instances of this: it is sufficient to mention Minos, Hercules, and other heroes, who received divine honours. It was one of the doctrines of Pythagoras, that good men, after death, were raised into the order of gods. Alexander the Great, according to some rather doubtful stories, not only claimed divine parentage, but a divine nature while on earth; and the compliment of deification was commonly paid to the princes of the various dynasties who succeeded to his empire. On the coins of the Seleucidæ we often find the word 'God' (Θεός). In Rome, also, we find Romulus raised to the rank of a god; but there are no instances of Romans admitted to the rank of deity from the expulsion of Tarquin until the empire of the Cæsars. Julius Cæsar was worshipped as a god (divus) after his murder. Augustus and the succeeding emperors, after death, were enrolled among the inhabitants of heaven.

The term *apotheosis*, however, is more especially used to signify the ceremony by which the Roman emperors were admitted, if we may use the expression, after death to divine honours. The ceremony is minutely described by Herodian (lib. iv. c. 3).

APO'TOME, in ancient Greek music, the remainder of a whole tone when diminished by a *limma* or smaller semitone, the ratios being 2187 and 2048. [COMMA; LIMMA; SCALE.]

APPALACHIAN MOUNTAINS. The Appalachian system runs along the eastern side of the Continent of North America, and includes the Chain of the Alleghanies. It consists of numerous parallel chains, some of which form detached ridges, extending, in most instances, in the same direction as the entire system which they contribute to form. Taken as a whole, it has a range which does not deviate materially from N.E. to S.W., and it extends about 1200 miles in length, from Maine to Alabama. The chief chains of mountains which form the system are the following:—The Blue Ridge, which lies nearest to the Atlantic; the Kittatinny Chain; the Alleghany Mountains, in the western part of Virginia and the central parts of Pennsylvania; the Cumberland Mountains, on the eastern boundary of Tennessee and Kentucky; the Catsbergs, or Catskill Mountains, in the state of New York; the Sacondago Chain, which is a continuation of the Catsbergs; the Green Mountains, in the state of Vermont; the Highlands, eastward of the Hudson River; and the White Hills, in New Hampshire. In the whole of the Appalachian system, there are no great detached mountain peaks: Mount Washington, in New Hampshire, 6634 feet, is the most elevated among them.

The Appalachian Mountains do not form a high dividing line between the waters which flow into the Atlantic on one side, and into the Mississippi on the other. They cover a widely-extended area of about 100 miles in breadth, only one-third of which is occupied by the mountain chains, the rest being the intermediate valleys. The rivers which rise in the Appalachians, flow in long valleys between the chains, and are deflected sometimes to the east, and sometimes to the west, after passing nearly at right angles through depressions in the ridges, or through deep rents in the mountains. The line of the great water-shed, between the streams that run to the Atlantic, and those that flow into the gulf of Mexico, runs from the sources of St. John's River, on the north-western limit of the state of Maine, to the Point of Florida, almost following the inflection of the coast. The land between the sea-coast and the foot of the most eastern of the Appalachian chains is of very unequal breadth. At the Hudson River, the Atlantic almost washes the base of the mountains, but from that point southward there is a gradual increase in the breadth of the Atlantic Slope, as it is called by the American geographers, as far as Cape Hatteras, in North Carolina, and from that point to the mouth of the Alatamaha in Georgia, the coast runs nearly parallel to the mountains, at a distance of about 200 miles. The western slope of the Appalachian system falls by a gentle but broken descent to the Mississippi; it is upwards of 1000 miles in length, and about 300 miles in width from the river to the base of the mountains, covering an area of about 300,000 square miles, unbroken by any other than gently rising hills, but deeply furrowed by rivers over its whole surface.

In the northern parts of the Appalachian system, a considerable tract of country is occupied by primary strata, such as gneiss, mica-slate, clay-slate, and granular limestone, associated with granites, serpentines, and traps, under various aspects, underlying and penetrating the strata. Grauwacke sandstone and slates and transition limestones are, however, more abundant in this mountainous range than the primary strata. Transition limestone occurs over a great extent of country along the north-western side of the Alleghany chain, associated with the grauwacke slate, but generally lying beneath it. It contains many caves, some of which are of great extent, and in these caves fossil bones of various animals have been found. Arenaceous and conglomerate grauwackes are perhaps the most frequent forms in which the transition rocks present themselves.

In Pennsylvania there is a vast deposit of coal, associated with sandstones and slates. The coal seems to be of that quality which in Britain is generally called *blind coal* or *anthracite*. One of these coal-fields, in the valley of Wyoming, is sixty miles long by five broad; a second is in the valley of the Lehigh river; and others on the Schuylkill, the Susquehanna, and the Lackawanna. Besides these beds of anthracite coal, there are beds of bituminous coal high up in the Alleghanies of Ohio.

Natural springs, extremely rich in salt, are found all along the western slope of the Appalachian system; and from Onondago, in New York, to the southern termination of the mountain system, wherever the earth has been penetrated to any considerable depth, salt water has been found; in some places, where the boring was from 300 to 400 feet, the water rushed up with so much force, as to rise like a fountain several feet above the surface of the ground.

The secondary formations of Europe, between the coal-measures and the chalk, seem to be of very rare occurrence all along the Atlantic slope. In New Jersey and Delaware there is a very extensive deposit of an argillaceous marl, containing, however, but a small quantity of lime. The country which intervenes between the mountains and the Atlantic is mostly covered with tertiary deposits. These deposits have been classed by Mr. Conrad as the *Lower* (containing chiefly extinct species of fossil shells), the *Middle* (containing a mixture of extinct and known species), and the *Upper* (containing only known species). The lower tertiary is met with at the western boundary of the Atlantic slope; the upper tertiary extends to the shores of the ocean. This last also occupies by far the greatest extent of surface, extending from 100 to 150 miles west from the sea. Remains of the mastodon and megatherium have been met with in alluvial accumulations above the tertiary deposits.

Among the unstratified rocks granites, sienites, and serpentines occur; columnar basalt and other trap rocks are also met with. Among the mineral products are iron, lead, and gold; but not in large quantity.

When America was first discovered by Europeans, an almost unbroken forest spread over and around the Appalachian mountains, and it ex-

tended to the Atlantic Ocean, the Gulf of Mexico, the St. Lawrence, and west of the Mississippi. The spots which have been cleared in this ocean of trees are very insignificant when compared with its vast extent, which has been estimated at 2,000,000 of square miles. The trees growing on and near the mountains are the oak, the pine, the hickory, the sugar and other maples, the Weymouth pine, the hemlock spruce, the laurel, the magnolia, the liriodendron, and many others.

(Darby's *View of the United States;* various articles in Silliman's *Journal of Science;* Maclure's *Geology of the United States.*)

APPALACHICO'LA. [GEORGIA; FLORIDA.]

APPARA'TUS SCULPTO'RIS, or the Sculptor's Workshop, a constellation formed by Lacaille. It is situated in the region of the heavens immediately to the eastward of the large star Fomalhaut or *a* Piscis Australis, and hardly rises above the horizon in our hemisphere. It is bounded by Cetus, Aquarius, Fornax Chemica, Piscis Australis, and Phœnix.

APPA'RENT (in Astronomy). When it is necessary or convenient to reduce an observed phenomenon, either by clearing it of the effects of any optical delusion, or substituting for it the phenomenon which would have been observed at some more commodious station, that which is actually observed is called the *apparent* phenomenon, in opposition to that which results from correction or reduction.

APPARENT MAGNITUDE, the angle under which any line appears at the eye, that is, the angle made by lines drawn from its extremities to the eye. [MAGNITUDE.]

APPARENT MOTION, the velocity and direction in which a body appears to move, when the spectator himself is in motion, without being conscious of it. [MOTION.]

APPARITION. The mind affects the body; the body affects the mind, and some insight may be obtained into the disordered states of the mind, by considering the physical conditions which are necessary to sound thought.

It is not true, as is commonly supposed, that we see with the eye, and hear with the ear, and taste with the tongue. The true seat of these sensations is the brain, and the eye, the ear, the tongue, are organs adapted to receive impressions from external objects, which impressions are transmitted from the organs by an appropriate apparatus to the brain, where they become sensations. When an object is presented to an organ of sense, it produces a change in the nerves of that organ. This change is conveyed by the nerves to the brain; a corresponding change is occasioned in the brain, and through the brain in the mind; and it is this change in the mind which is expressed by the term sensation. Ideas, on the contrary, are copies of sensations, renovations of prior feelings, in general differing from sensations in being less intense.

The functions of the brain, then, are sensation, and, if the analogous term be allowed, ideation, together with the action and re-action of these two states on each other, known under the name of intellectual operation. The main instrument by which intellectual operation is carried on is what is termed association. It is a property of the mind to combine and unite the sensations and ideas it receives in such a manner, that, after this combination or union has been once formed, if any one of these sensations and ideas be revived, the single sensation or idea so revived will immediately call up to view all the sensations and ideas that had previously been connected with it; and this power of association, as long as its action is sound, is observed to operate in a uniform and determinate manner. For example, when sound, association excites ideas in a certain order, generally in the order of sensation. Thus, if the sensations A B C were impressed upon the mind in the order of these letters, B will re-excite not A, but C. Association, when sound, operates by exciting ideas with a certain degree of velocity. If the rapidity of the succession of the trains of ideas pass beyond a certain point, instead of distinct there is confused thought. Association, when sound, operates by exciting ideas with a certain degree of vivacity. Sensation is not produced, unless the external object be applied to the organ of sense with a certain degree of force; while, if propelled against it with too great an impetus, instead of specific sensation, it excites only pain. In like manner, unless the trains of ideas recalled by association possess a certain degree of vivacity, they present to the mind an indistinct assemblage of images; if, on the other hand, they are too vivid, they are equally incapable of forming the elements of sound thought.

In order that the brain may carry on these operations, that is, in order that it may receive the impressions conveyed to it by the nerves from the organs of sense, in order that it may convert these impressions into sensations, and in order that it may duly combine and revive them, it must be in a sound state. The chief agents which maintain the brain in a sound state are its organic nerves and its circulating vessels. Like every other organ, the brain is maintained in a healthy condition by the organic process of nutrition, over which the system of nerves termed organic preside. If these organic nerves become disordered, disease may take place in the substance of the brain, and this disease may assume a variety of forms far too great to be enumerated here, the slightest of which may be incompatible with the production of sound thought. If, on the other hand, the flow of blood through its circulating vessels be deranged, the process of thought may be equally disordered. Stop the flow of blood to the brain altogether, insensibility will follow instantly; fainting will supervene, and this state will be quickly succeeded by death, unless the vital current be re-admitted. Quicken the circulation beyond a certain point, insensibility equally follows; and, though the preternatural velocity of the circulation should stop short of inducing insensibility, it may yet disturb the ordinary process of thought in an infinite variety of modes.

Now there is scarcely a single disease which is not capable of disturbing, in a greater or less degree, the action of the organic nerves of the brain; but the maladies which most commonly and re-

markably disturb the functions of these nerves are certain diseases of the abdominal viscera, particularly of the alimentary canal, and more especially of that portion of it which forms the stomach; certain diseases of the liver, and of the mesenteric glands, and of the urinary and reproductive organs. In like manner excitation or depression of the action of the blood-vessels of the brain, beyond a certain point, uniformly disorders sensation and all the mental operations. Striking illustrations of both are afforded by the effect of many physical agents, as well as of natural diseases. Of the first, the effects of the inhalation of nitrous oxide affords an example. When nitrous oxide is received into the lungs, the pulse is increased in strength, fulness, and velocity. A corresponding change takes place in the mental impressions. Sensation becomes more vivid; the sensibility to touch increases; luminous points dazzle the eye; the hearing is more acute; recollections, generally of a pleasing nature, and of uncommon intensity, pass rapidly through the mind. One individual compares his feelings, under the influence of this gas, to those which he experiences when witnessing an heroic scene upon the stage; another likens them to the emotions he felt when, on the occasion of the commemoration held at Westminster Abbey in honour of Handel, he heard seven hundred instruments playing at one time.

In the same way, in certain diseases of the brain attended with excitement, persons exhibit a remarkable capability of reproducing and combining images of external objects; and whoever will consider carefully the mental phenomena produced by the different and opposite conditions of the brain in such cases, the one produced by the operation of a physical agent, the other arising under the influence of disease, will have no difficulty in conceiving the origin of spectral illusions, either with the consciousness that they are illusions, or with a temporary or permanent persuasion that they are real existences, and whether arising from external or internal causes, or from both combined.

The case of Nicolai, the celebrated bookseller of Berlin, affords a curious illustration of the long continuance of vivid spectral illusions, without the slightest belief of the real existence of the apparitions.

Some minds, such as that of Nicolai, have a strong natural tendency to form vivid pictorial images of every thing that interests them; in others, there is a like tendency to the intense renovation of past impressions. 'I remember,' says Dr. Ferriar, 'that, about the age of fourteen, if ever I had been viewing any interesting object in the course of the day, such as a romantic ruin, a fine seat, or a review of a body of troops, as soon as evening came on, if I had occasion to go into a dark room, the whole scene was brought before my eyes with a brilliancy equal to what it had possessed in daylight, and remained visible for several minutes. I have no doubt that dismal and frightful images have been often presented to the mind in the same manner after scenes of domestic affliction or public horror.' Certain states of the body, and certain affections of the mind, powerfully predispose to the intense renovation of past impressions, however those impressions have been induced, and whatever their nature, the immediate exciting cause of the renovation being often some external object acting upon the senses or upon the imagination under circumstances favourable to the illusion. A large class of spectral illusions are referable to this head, of which the following may be taken as an example. A gentleman was benighted, while travelling alone, in a remote part of the highlands of Scotland, and was compelled to ask shelter for the evening at a small lonely hut. When he was to be conducted to his bedroom, the landlady observed, with mysterious reluctance, that he would find the window very insecure. On examination, part of the wall appeared to have been broken down to enlarge the opening. After some inquiry, he was told that a pedlar, who had lodged in the room a short time before, had committed suicide, and was found hanging behind the door in the morning. According to the superstition of the country, it was deemed improper to remove the body through the door of the house; and to convey it through the window was impossible, without removing part of the wall. Some hints were dropped that the room had been subsequently haunted by the poor man's spirit. My friend laid his arms, properly prepared against intrusion of any kind, by the bedside and retired to rest, not without some degree of apprehension. He was visited in a dream by a frightful apparition, and, awaking in agony, found himself sitting up in bed, with a pistol grasped in his right hand. On casting a fearful glance round the room, he discovered by the moonlight a corpse dressed in a shroud, reared erect against the wall close by the window. With much difficulty he summoned up resolution to approach the dismal object, the features of which, and the minutest parts of its funeral apparel, he perceived distinctly. He passed one hand over it, felt nothing, and staggered back to bed. After a long interval, and much reasoning with himself, he renewed his investigation, and at length discovered that the object of his terror was produced by the moonbeams, forming a long bright image, through the broken window, on which his fancy, impressed by his dream, had pictured, with mischievous accuracy, the lineaments of a body prepared for interment. Powerful associations of terror, in this instance, had excited the recollected images with uncommon force and effect.

The peculiarity of constitution expressed by the term predisposition, whether corporeal or mental, is not only deeply implicated in the production of a general tendency to the formation of these phantoms, but it often determines even the specific character which each assumes. Since the predisposition varies in each individual, the same morbid cause may conjure up images the most diversified. The inhalation of nitrous oxide commonly excites vivid images of a pleasing nature, accompanied with grateful sensations; but in some cases it presents to the imagination frightful pictures, and produces on the system painful effects; and, for the same reason, the morbid cause, whatever it be, which gives rise to spectral illusions, may in one excite soothing and delightful visions, and in another hideous and appalling spectres. The daughter of

Sir Charles Lee 'saw, about two of the clock in the morning, the apparition of a little woman between her curtain and her pillow, who told her she was her (deceased) mother; that she was happy, and by twelve of the clock that day she should be with her. Whereupon she knocked up her maid, called for her clothes, and when she was dressed she went into her closet, and came not out again till nine, and then brought with her a letter, sealed to her father; brought it to her aunt, the Lady Everard, told her what had happened, and desired that as soon as she was dead it might be sent to him. She desired that the chaplain might be called to read prayers; and when prayers were ended, she took her guitar and psalm-book, and sat down upon a chair without arms, and played and sang so melodiously and admirably, that her music-master, who was then there, admired at it. And near the stroke of twelve she rose and sat herself down in a great chair with arms, and fetching a strong breathing or two, immediately expired.' In this case, a spectral illusion occurring in a tender and susceptible frame, produced such a powerful impression upon the imagination as absolutely to destroy life.

In regard to ghosts, it is observable that they were remarkably abundant in this country during the interregnum after the civil war in 1649. 'The melancholic tendency of the rigid puritans of that period; their occupancy of old family seats, formerly the residence of hospitality and good cheer, which in their hands became desolate and gloomy; and the dismal stories propagated by the discarded retainers to the ancient establishments, ecclesiastical and civil, contributed altogether to produce a national horror unknown in other periods of our history.' It is well known that ghosts commonly appear in the same dress they wore when living; sometimes, indeed, they are clothed all in white, but these are chiefly the 'churchyard ghosts, who have no particular business, but seem to appear *pro bono publico*, or to scare drunken rustics from tumbling over their graves. Dragging chains is not the fashion of English ghosts, chains and black vestments being chiefly the accoutrements of foreign spectres, seen in arbitrary governments—dead or alive English spirits are free.' Ghosts are commonly pale, and often assume a misty or cloudy appearance, the spectral idea of colour not quite equalling in intensity the vividness of an immediate sensation. The phantoms seen by Nicolai were always of a paler colour than real beings; and when they began to diminish and disappear their colour became fainter and fainter, until at last they appeared entirely white.

We cannot dismiss the subject of apparitions without observing, that the manner in which these phantoms have vanished before the light of knowledge affords a striking illustration of the blessings which descend even to the lowest of the people from the diffusion of the sound principles of philosophy. The powerful and capricious spirits which filled 'the heavens, the earth, and the waters above and under the earth,' added, in no inconsiderable measure, to the sum of human suffering. They were, in general, hideous in form and

malignant in intention; the number of the good small, that of the evil countless; and though of 'soft and uncompounded essence,' they might have come in what shape they chose, 'dilated or condensed, bright or obscure,' yet they did assume 'forms forbidden,' such as 'retire to chaos, and with night commix;' and their visitations were much more often accompanied with 'blasts from hell' than 'airs from heaven.' They produced powerful emotion, for the most part painful and of pernicious tendency. They afforded materials for the fiction of the poet, and the pencil of the painter; but the imagery of the one, and the figures of the other, were distinguished for incongruity and deformity, not for beauty and grace. Haunting the couch of sickness, in minds debilitated by disease, they often chased reason from its throne, and sometimes deprived the sufferer of life. The ignorant they terrified with false fears, and they afforded no compensation in the uniformity and efficacy with which they visited the guilty with remorse. As agents in the administration of reward and punishment, they were most unjust. If they brought down vengeance on the criminal, it was not for the commission of crime, but the neglect of punctilios; and if, as guardian angels, they hovered about the pillow of the dying, they were not messengers of evil to the wicked, and ministers of grace to the good; but this 'blessed troop, with faces bright like the sun, bearing garlands, and promising eternal happiness,' was as disposed to waft to heaven the soul of the sinner as of the saint. By preoccupying the mind, they took off the attention from the observation of nature, and deprived it both of the power and of the disposition to discover the true solution of those physical, mental, and moral phenomena which could not wholly escape notice, and in this lies the real malignity of their influence. They incapacitated the mind for the perception of truth, disposed it for the reception of the grossest delusions of credulity, and prepared it for the admission of the most fallacious account of the sources of calamity and suffering. In the hands of the priest and the tyrant, they were potent to delude and enslave; and they did their work faithfully. The human mind will anticipate the future, and must reflect upon the past. In the former there will always be sufficient to fear, and in the latter enough to regret, without the stimulus of fictitious terror, or the imputation of imaginary guilt. As long as the human frame can suffer, and is subject to death, the mind will require whatever light philosophy can pour upon it, to preserve it from error, and whatever consolation religion can afford, to save it at least from misery, if not from despair. In philosophy there is light, and in religion consolation; and he is a friend to man who labours to secure to him these inestimable blessings, free from the admixture of ignorance and the alloy of superstition.

(*Westminster Review*, No. II.; *An Essay towards a Theory of Apparitions*, by John Ferriar, M.D., 1813; *Sketches of the Philosophy of Apparitions, or an Attempt to trace such Illusions to their Physical Causes*, by Samuel Hibbert, M.D., 1824.)

APPA'RITOR, an officer employed as messenger and in other duties in ecclesiastical courts. It is the duty of the apparitor to call defendants into court, and to execute such commands as the judge may give him, and this duty is not to be performed by deputy. The apparitors of the ecclesiastical courts are paid by fees, which generally do not amount to much. The emoluments of the apparitor of the Prerogative Court of Canterbury, in 1843, amounted to 320*l*.

Apparitor is a Roman word, and signified any person who was in attendance on public functionaries (*iis apparebat*, whence the name) to execute their orders. The term accordingly includes a great variety of officers in the Roman system. Under the later empire various magistrates and functionaries had their apparitores, whose duties and privileges are enumerated in the Justinian Code, 12, tit. 52, &c.

APPEAL. This word is derived immediately from the French *appel* or *apël*, which is from the Latin *appellatio*. The word *appellatio*, and the corresponding verb *appellare*, had various juridical significations among the Romans. It was used to signify a person's applying to the tribunes for their protection; and also generally to signify the calling or bringing of a person into court to answer for any matter. Under the empire, *appellatio* was the term used to express an application from the decision of an inferior to a superior judge on some sufficient ground. The first title of the 49th book of the 'Digest' is on Appeals (De Appellationibus). In the French language, the word appellant signifies he who appeals, he who makes an appel from the decree or sentence of an inferior judge; and both words have the same sense in the English. Appel also signifies a challenge to single combat.

APPEAL, in the old criminal law of England, was a vindictive action at the suit of the party injured, in which suit the appellant, instead of merely seeking pecuniary compensation, as in civil actions, demanded the punishment of the criminal. It was in the power of the appellant alone to relinquish the prosecution, either by releasing his right of appeal or by accepting a compromise.

Another remarkable feature of appeal was the mode of trial, which in cases of treason or capital felony was either by jury or by *battle*, at the choice of the defendant.

Where the latter form of trial was adopted, the appellant charged the *appellee* with the offence: the latter denied his guilt, and declared himself ready to prove his innocence by a personal combat. The challenge was accepted by the appellant, unless he could show that the defendant was not entitled to the privilege of battle. A day was appointed by the court for the combat, the defendant was taken into custody, and the accuser gave security to appear at the time and place fixed. On the day of battle, the parties met in the presence of the judges, armed with certain weapons. If the defendant was vanquished, sentence was passed upon him, and he was forthwith hanged. But if he was victorious, or was able to persist in the combat till starlight, or if the appellant yielded, and cried *craven*, the defendant was acquitted of the charge, and the appellant was compelled to pay damages to the accused, and subjected to heavy civil penalties and disabilities.

It appears probable that the trial by battle was introduced into England from Normandy. The *Grand Coustumier* of that country, and the *Assizes of Jerusalem*, furnish evidence of its early existence. The courts in which it was admitted were the King's Bench, the Court of Chivalry, and (in the earlier periods of our history) the High Court of Parliament.

In some cases the appellant was able to deprive the accused of his choice of trial, and to submit the inquiry to a jury. If the appellant was a female; or under age; or above the age of sixty; or in holy orders; or was a peer of the realm; or was expressly privileged from the trial by battle by some charter of the king; or laboured under some material personal defect, as loss of sight or limb; in all such cases he or she was allowed to state in a counterplea the ground of exemption, and to refer the charge to the ordinary tribunal. The party accused was also disqualified from insisting on his *wager of battle*, where he had been detected in the very act of committing the offence, or under circumstances which precluded all question of his guilt. In 1819 an act (59 Geo. III. c. 46) was passed to abolish all criminal appeals and trial by battle in all cases, both civil and criminal.

APPEAL. The removal of a civil cause from an inferior court or judge to a superior one, for the purpose of examining the validity of the judgment given by such inferior court or judge, is called an appeal.

In criminal cases, the judge may, if he think proper, reserve a point for consideration. If the case be considered by the judges, the reasons for affirming the sentence, or for recommending a pardon, are not publicly delivered. In every criminal case recourse may at present be had to the Secretary of State; but as a matter of course he would refer to the judge, and unless the judge is favourable there is very little chance that the Secretary of State would grant relief.

APPEAL TO THE SESSIONS. [SESSIONS.]

APPEARANCE. [PLEADING.]

APPENDINI, FRANCESCO MARIA, born near Turin in 1768, studied at Rome, where he entered the order of the Scolopj, and was after a time sent to fill the chair of rhetoric in the college of his order at Ragusa, a town which then maintained a close connection with Italy. He became a great proficient in the Slavonian language, and he published a grammar of the Illyric language, that is to say, of the Dalmatian dialect of the Slavonian, and several treatises on the same subject. But his principal work concerns the history of his adopted country, Ragusa, and it gives a very interesting account of that now almost forgotten little state, which governed itself for centuries as a republic, and cultivated the arts and retained the manners of civilized Europe on a narrow nook of land on a barbarous coast, surrounded and yet respected by the Ottoman power: 'Notizie istorico-critiche sulle Antichità, Storia, e Letteratura dei Ragusei,' 2 vols. 4to. 1802-3.

When Napoleon took military possession of Ragusa, and subverted that ancient republic, as he had subverted the republics of Venice, Genoa, and Lucca, in Italy, Appendini was retained as rector of the college of Ragusa. After the Austrians had superseded the French in 1814, Appendini was commissioned by the imperial government to establish a school for teachers at Zara, with the view of providing masters for the various schools of Dalmatia. Consequently he removed from Ragusa to Zara, where, after remaining several years, he died in 1837, and was buried with great honour. He was much regretted both at Zara and Ragusa as a very useful and enlightened educator of youth, in a country which stood particularly in need of such.

(Tipaldo, *Biografia degli Italiani Illustri del Secolo XVIII. e dei Contemporanei.*)

APPENZELL, one of the twenty-two Swiss cantons. It lies at the north-eastern extremity of Switzerland, and is enclosed on every side by the territory of the canton of St. Gall. The whole extent of the canton is about 152 square miles, and its population is 55,000. Appenzell is, next to Geneva, the most thickly inhabited canton of Switzerland, in proportion to its extent. Its territory is very mountainous, though it is not within the range of the higher Alpine chains; the mountains are calcareous, and mostly covered with rich pastures; the highest of them, called the Sentis, on the southern border of the canton, is 7700 feet above the level of the sea.

The river Sitter, which has its source at the foot of this mountain, crosses Appenzell in a north-western direction, and afterwards joins the river Thur in the canton of Thurgau. Appenzell produces little corn, and has no vineyards except on some of the eastern hills, which slope towards the valley of the Rhine. Numerous herds of cattle and flocks of sheep feed on the high lands; the former amount in summer to 25,000 head. Butter, cheese, honey, and wax, are the chief produce. In the northern and western districts manufactures of linen, cotton, muslins, damask, &c., afford employment to a great part of the population.

In its internal administration Appenzell is divided into two distinct republics independent of each other, called interior and exterior *rhoden*, or communes. The former are Catholic, the latter Protestant. The separation took place in 1597. The Protestant districts of Appenzell are more populous and industrious than the Catholic districts, the inhabitants of the latter being chiefly addicted to pastoral life. The Catholics number about 15,000, the Protestants about 40,000. The chief towns are:—Appenzell, the capital of the Catholic part of the canton and residence of the council of government. It stands on the Sitter, 9 miles south of St. Gall, and, including the commune, has a population of 5000: Trogen, at the foot of Mount Gäbris, which has some manufactures of linen and cotton, and is the chief town of the Protestant district; population 2400: Herisau, a well-built and busy place also in the Protestant part of the canton; it has manufactures of muslin, cotton, and linen; population 7000: and Gais, on the south side of Mount Gäbris, which is annually frequented by a large number of invalids to drink whey and breathe the pure air of the district.

The country of Appenzell was little known till the 7th or 8th century, when the Frankish kings who ruled over eastern Helvetia bestowed the royal domains in these mountains and valleys on the Abbey of St. Gall. By degrees the abbey acquired jurisdiction over the whole country, and this power was confirmed in 1292 by a grant from the Emperor Adolphus of Nassau. The abbots built a monastery dependent on that of St. Gall, which was called Abbatis Cella, and in German Abten-zell, whence the name of Appenzell was given first to the village which grew around the monastery, and afterwards to the whole country. The inhabitants at first enjoyed considerable privileges under the dominion of the Abbots, but in course of time oppressive dues and fees were demanded of them, and their liberties encroached upon by the bailiffs of their rulers. After many ineffectual complaints and remonstrances, the Appenzellers, in the year 1401, rose in arms, surprised the castles which the abbot had built in their country, and drove his bailiffs away. A war ensued, which lasted several years, and during which the mountaineers of Appenzell drove the abbot away from his abbey, overran Thurgau, and even advanced across the Rhine as far as Bregentz, in the Austrian states. At last peace was made, and the Appenzellers were recognised as an independent people; but it was not till the year 1513 that they were finally received into the Swiss confederation, of which they formed the 13th canton. They have ever since retained their simple form of government, and, with the exception of the French invasion of 1798, have preserved their independence.

APPENZELL, Town. [APPENZELL, Canton.]

APPIA VIA, an ancient road in Italy. It was first laid down as far as Capua by Appius Claudius, who afterwards, in his censorship, B.C. 312, from the loss of his sight, was called Cæcus. At a later period, it was continued as far as Brundisium. The towns through which it passed are mentioned in the ANTONINE ITINERARY. The road, parts of which still exist, was built of squared stones, closely fitted together without cement or iron, of various sizes, from one to five feet. There are two strata beneath; the first of rough stones cemented with mortar, the second of gravel, the whole being about three feet in depth. The breadth of the road is about fourteen feet, so as to admit two carriages. Part of the road between Rome and Terracina passed through the POMPTINE MARSHES.

APPIA'NI, FRANCESCO, a distinguished fresco painter of the eighteenth century, was born at Ancona in 1702. He was employed by Benedict XIII. at Rome, but he lived chiefly at Perugia, where he continued to paint until his ninetieth year and his death in 1792; a degree of vigour, except in the cases of Spinello Aretino and Titian, perhaps without a parallel. He painted, according to Lanzi, many pictures for England.

APPIA'NI, ANDRE'A, probably the best fresco painter of the eighteenth century, was born at Milan in 1754. After visiting and studying in the principal cities of Italy, he chose Correggio for his model. From 1795 until 1813, he worked with great applause at Milan: but in the latter year he was compelled to desist from his labours by a stroke of apoplexy, a second attack of which, in 1817 or 1818, caused his death.

Appiani was Napoleon's principal painter in Italy, for which office he received an annual pension of 6000 francs. He was a knight of the Iron Crown, and a member of the Legion of Honour. He however died in poverty, having lost his pension in consequence of the Restoration in 1814.

His principal frescoes are in the church of Santa Maria Vergine, and in the royal palace of Milan; the latter have been engraved by Rosaspina. He was also an excellent painter in oils: there is a portrait of Napoleon by him, which has been engraved by Bartolozzi.

(Lamberti, *Descrizione dei Dipinti a buon Fresco eseguiti dal S. A. Appiani*, Milan, 1809; Lanzi, *Storia Pittorica*, &c.)

APPIA'NO, D', an Italian family of the middle ages, which rose to the rank of sovereign princes. Jacopo d'Appiano was, in the latter part of the fourteenth century, the confidential secretary and friend of Pietro Gambacorta, the then chief magistrate of Pisa, who appointed him chancellor of that republic. He conspired however against his benefactor, and had him killed, together with his sons, A.D. 1392. He thus acquired Pisa, which was retained till about 1400, when his son sold it to the Duke Visconti of Milan for 200,000 florins, reserving for himself the sovereignty of Piombino on the sea-coast, and of the island of Elba opposite. The family continued in possession of Piombino till 1589, when Alessandro, the last possessor, was killed, and it fell into the hands of Spain. In 1619 the Aulic Council adjudged it to the house of Mendoça as being the next heirs, from whom the Italian house of Ludovisi purchased the fief, which afterwards passed by inheritance into the house of Buoncompagni of Rome, who kept it till the French revolutionary invasion. Bonaparte, on his assuming the imperial crown, bestowed the principality of Piombino on his brother-in-law Felix Baciocchi.

(Tronci, *Memorie Istoriche di Pisa*; Botta, *Storia d'Italia*)

APPIA'NUS, a Greek and native of Alexandria, in Egypt. In the preface (c. 7) he speaks of an interval of two centuries between the dictatorship of Cæsar (B.C. 49 or 47) and the time when he wrote his history, which fixes it in the reign of Antoninus Pius (A.D. 138—161). The date of 'nearly nine centuries' from the foundation of Rome (c. 9) leads to the same result. He speaks of Hadrian as no longer alive, in two separate passages ('Iberica,' 38; and 'Bell. Civ.' i. 38). He also mentions the vengeance which Trajan and his generals inflicted on the Jews in the last year of his life (116, 117, A.D.), as occurring in his own time ('Bell. Civ.' ii. 90). Appian practised as an advocate at Rome under more than one emperor; and he was employed as a procurator of the Cæsars or a governor, but about this he expresses himself very obscurely ('Preface,' c. 15, and Schweighäuser's note). His history treats of the several parts or provinces of the Roman empire separately; he takes them up in succession as they become connected with Roman history, and then gives an account of their relations with Rome. But, to make his work complete, he gave a preliminary view of Rome under the kings, and devoted a book to the wars of Hannibal. He also assigned five books at least to the civil wars of Rome. Of his twenty-two books, the sixth, seventh, eighth, the latter part of the ninth, the eleventh, twelfth, and those on the Civil Wars, still exist, besides some fragments of the others. There is also attributed to him a work called Parthica, which consists only of extracts from Plutarch's Lives of Crassus and Antonius, with an introduction from Appian's own work on Syria. But the Parthica is probably not by Appian. Appian was well acquainted with Roman affairs and the Latin language. He sometimes shows great ignorance or carelessness about geography. His history of the Civil Wars, of which five books are extant, is a valuable work; it begins with the agrarian agitation of the Gracchi, B.C. 133; and is continued to the death of Sextus Pompeius, B.C. 35. The first edition of part of the Greek text was given at Paris in 1551 by Carolus Stephanus, with the assistance of his brother Robert. In 1554, an improved Latin translation by Gelenius was published at Basle. The best edition is that of Schweighäuser, Leipzig, 1785, 3 vols. 8vo., with a Latin translation, founded chiefly on that of Gelenius, and notes. A. Mai has published three small fragments of Appian in the second volume of his 'Script. Vet. Nova Collectio.' There is a German translation by F. W. J. Dillenius, 2 vols. 8vo., Frankfort, 1793–1800; one in French, by Claude Seyssel, fol., Lyon, 1544; another by Odet Desmarres, fol., Paris, 1659; and a translation of the five books of the 'Civil Wars,' by Combes Dounous, Paris, 1808, 3 vols. 8vo. An English translation of Appian's 'Auncient History,' &c., was printed by Raufe Newbery and Henrie Bynniman, in 1579, 4to.; and a translation by J. D. (Dryden or Davies) was published in folio, 1696.

APPIUS CLAUDIUS. [CLAUDIUS.]

APPLE. [PYRUS.]

APPLE. This fruit, which, from its hardiness and great abundance, combined with its excellent flavour, is one of the most important productions of cold climates, is, in its wild state, the austere crab-apple of the hedges. At what period it first began to acquire from cultivation the sweetness and other qualities which are peculiar to it in its domesticated state, or by what accident the tendency to amelioration was first given it, we have no means of ascertaining. All that we know is, that the apple is spoken of by Homer as being one of the fruit-trees cultivated in the gardens of Alcinous and of Laertes, that it was a favourite fruit of the Romans, who had many varieties, and that it has never ceased to be an object of great interest with all northern nations.

In procuring improved varieties of the apple, no other mode which leads to certain results has been discovered, than that of cross-fertilization: but, at the same time, it is believed that the following circumstances ought to be kept in view:—1st, the seed from which the new variety is to be obtained should be fully formed; and 2nd, it should be taken from as perfect a specimen as it may be practicable to procure; for it has been found by experience, that any debility or defect in the parent is, in fruit-trees, very apt to be communicated to their offspring.

England is celebrated for the excellence of its cider, a beverage which perhaps acquires its highest degree of excellence in Herefordshire and the neighbouring counties. [CIDER.]

For the kitchen, the apple is certainly, of all fruits, the most useful; and perhaps it is here that its utility to man is most conspicuous, because it proves, when cooked, a nutritious and wholesome food. In every district there is an abundance of local varieties, which are considered by their cultivators as of peculiar excellence. But, for those who are anxious to possess the kinds which have been determined by comparison to be the best of all, we should recommend the following: for summer use, the Keswick Codlin and the Hawthornden; for autumn, the Wormsley Pippin and the Alfriston; for winter and spring, the Bedfordshire Foundling, Dumelow's Seedling, Dr. Harvey, Brabant Bellefleur, and Gravenstein; and for drying, the Norfolk Beaufin. Of all these, the Gravenstein, Alfriston, and Brabant Bellefleur are the best.

Of table apples, the varieties are endless; but by far the greater part of the local sorts, and of those commonly cultivated, is of only second-rate quality. The finest variety of all is the Cornish Gilliflower; no other equals this in excellence, but it is unfortunately a bad bearer. Of those which combine productiveness and healthiness with the highest quality, the six following must be considered the best:—Golden Harvey, Old Nonpareil, Hubbard's Pearmain, Ribston Pippin, Dutch Mignonne, Court of Wick. Finally, the best selection that could be made for a small garden, so as to obtain a constant succession of fruit from the earliest to the latest season, would be the following, which are enumerated in their order of ripening, the first being fit for use in June, and the last keeping till the end of April:—White Juneating, Early Red Margaret, White Astrachan, Sugar-Loaf Pippin, Borovitsky, Oslin, Summer Golden Pippin, Summer Thorle, Duchess of Oldenburgh, Wormsley Pippin, Kerry Pippin, Yellow Ingestrie, Gravenstein, Autumn Pearmain, Golden Reinette, King of the Pippins, Ribston Pippin, Fearn's Pippin, Court of Wick, Golden Harvey, Golden Pippin, Beachamwell, Adam's Pearmain, Pennington's Seedling, Hughes's Golden Pippin, Cornish Gilliflower, Dutch Mignonne, Reinette du Canada, Syke-House Russet, Braddick's Nonpareil, Old Nonpareil, Court-Pendu Plat, Lamb-Abbey Pearmain, Newtown Pippin.

In *pruning* the apple-tree, as indeed in all similar cases, three objects are chiefly kept in view; the first of which is to remove superfluous or excessively vigorous shoots; the second is to admit light and air to all parts equally; and the third is to check exuberance, and thus to promote fruitfulness.

Apple-trees are trained in the form either of standards, dwarfs, espaliers, or balloons. No particular care is requisite in the management of *standards* beyond providing them with a straight stem six feet high, and a head consisting of three or four healthy shoots to commence with; and afterwards keeping the branches so pruned that they do not chafe against each other in windy weather, nor overshadow each other; all the rest is generally provided for sufficiently by nature herself. They are principally employed in planting orchards, being now seldom admitted into good gardens.

For garden purposes, *dwarf* apple-trees are so far superior to all others, that they are now almost exclusively planted. Independently of the little space they occupy, the small degree in which they overshadow the soil, and the great facility they offer for gathering their fruit, they are generally so much beyond the influence of high winds as to have but little of their crop blown down by autumnal gales, and their fruit is also finer than on standards.

Espalier apple-trees were formerly much used, but they are in all respects so greatly inferior to dwarfs, and so much more expensive to keep in good order, that we omit all further notice of them.

A mode of managing apple-trees called *balloon-training* has been much recommended. It consists simply in this: you plant a common standard tree, with a stem six or seven feet high, and with five or six good equal-sized branches; to the tip of each branch is to be attached a cord which passes under a peg driven into the ground near the stem, and by means of which the branches may be gradually drawn downwards so as to become inverted, when, from the breadth of the part of the tree whence the branches diverge, and the approximation of their points, the whole assumes the appearance of a balloon. All the care that these trees require is, to have their branches kept at equal distances by means of a hoop, or some such contrivance, until they are strong enough to preserve their acquired direction, and to have all the shoots which will every year spring upwards from them carefully cut away, except such as can be brought down so as to fill up the spaces in the circumference of the balloon head.

Many different methods of *preserving* apples have been recommended, and almost every one has some favourite plan of his own. As far as our experience goes, the best mode is to allow the fruits, after being gathered, to lie till their superfluous moisture has evaporated, which is what is technically called 'sweating;' the apples should then be wiped quite dry, wrapped in tissue paper, and stowed away in jars or chests of pure silver sand which has been previously dried in an oven. They should always be taken out of the sand a few days before they are wanted, and laid in dry fern or some such substance; they then absorb oxygen, and acquire a little sweetness, which is necessary to their perfection.

The apple is propagated by either *budding* or *grafting;* the former practice is preferable for standards, the latter for dwarfs. The stocks that are employed are the wild crab, the doucin or English paradise, and the French paradise apple. The former should be used for standards only, as it imparts too much vigour to the scions to render them manageable as dwarfs; the French paradise should always be employed for the latter, as it has the property of stunting the shoots, and rendering them much more fertile. The doucin or English paradise stock, which is what the English nurserymen usually sell as *the paradise stock,* is intermediate in its effect between the crab and the French paradise, being less vigorous than the first and more so than the last. When there is no wish to confine the dwarf trees within a very narrow compass, this kind of stock, which is hardier than the French paradise, is the proper one to employ; but if the dwarfest trees that can be procured are the objects of the cultivator, then the latter only should be planted. [Budding; Grafting.]

It is only necessary to add that the proper season for planting the apple is in October or November, as soon as the leaves are dead or discoloured, and beginning to drop. Vegetation at that season is not altogether torpid, but goes on just enough to enable the plants to send out a few rootlets before winter, and to prepare themselves for taking advantage of the first period of growth in the succeeding spring—a period, the commencement of which is never exactly known by external indications.

APPLE, LOVE. [Love Apple.]

APPLE, PINE. [Pine Apple.]

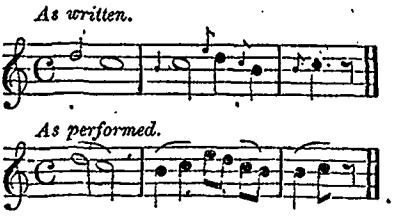
APPLEBY, a market town and borough in the county of Westmoreland, of which it is the capital; 270 miles N.N.W. from London, and 31 S.E. of Carlisle, 54° 35′ N. lat., 2° 28′ W. long. It is situated on the river Eden, which falls into the Solway Frith. Appleby contains two parishes, St. Lawrence on the left bank of the river, and St. Michael on the right bank. The river is crossed by an ancient stone bridge. The parishes are separate vicarages. The principal buildings are—the castle, the keep of which is in good preservation, and bears the name of the Cæsars' Tower, though it is not of Roman origin; the parish church of St. Lawrence; and the market house, which was rebuilt in the Gothic style in 1811; the town-hall; the shire-hall; and the new gaol. The Lent and Summer assizes are held here.

The market is on Saturday, chiefly for corn; and there are several fairs for cattle, horses, sheep, and linen cloth; especially a cattle fair once a fortnight from Whitsun-eve to Michaelmas. The population of the township of Appleby was, in 1841, 751, and of the township of Bondgate 618; but the parishes of St. Lawrence and St. Michael had 1354 and 1165 inhabitants respectively.

The borough returned two members to parliament till the passing of the Reform Bill, when it was disfranchised. It is still a municipal corporation, with a mayor, twelve aldermen, sixteen common-councilmen, and other officers.

APPOGGIATU'RA (from the Italian verb *appoggiare,* to lean on), in music, a note of expression, or of graceful embellishment. This is invariably written in a smaller character than the essential notes of the melody. The *appoggiatura* should always have more or less pressure of the breath or hand, being, where the notation is accurate, used for the purposes of emphasis, especially in recitative, where it is quite as important as the notes in a larger character.

The *appoggiatura* takes its length, or duration, from the note it precedes, whence it almost invariably abstracts one-half; except in the case of a dotted or pointed note, from which it takes two-thirds. Example:—



The *appoggiatura* in the hands of an accomplished performer is the most expressive and impassioned addition intrusted to his discretion. But modern composers, unwilling perhaps to repose too much confidence in those who are to execute their works, generally write all that they mean to be introduced, trusting nothing to the judgment of the performer.

APPOINTMENT. [Power.]

APPORTIONMENT. Apportionment is a term of law which signifies the dividing of a rent, annuity, or other payment that is made at fixed intervals: the apportionment may be either among several persons entitled to the rent, or between the person entitled to the rent and the person or persons liable to the payment of it. The apportionment is generally pursuant to a positive rule of law.

A rent reserved out of land may be apportioned by granting the reversion of part of the land out of which the rent is reserved, or by granting part of the rent to one person and part to another. When rent is reserved upon a lease, and the lessor disposes of part of the lands in reversion, either by will or deed, the rent is apportionable, provided the lessee concur.

If land is let on lease with a rent reserved, as in a building lease, the lessor has a right of distress on all the land; and if the land is sub-let in smaller portions, each lessee is liable to be distrained on for any rent which may be due on the whole land, unless, as is generally the case, the original lessor agrees that the rent shall be apportioned on the several portions which are sub-let.

If a man having a rent-charge on lands purchases any part of them, the rent-charge is extinct as to the whole; but if part of the land out of which the rent issues descends upon the owner of the rent-charge, the rent will be apportioned. If a grantee of a rent-charge release all his right in part of the land charged, he extinguishes the whole rent; but if a grantee of a rent-charge re-

lease part of the rent to the grantor, the residue will remain charged on the land. A difficulty thus arises on the sale of part of lands subject to a rent-charge. If the party entitled to the rent is willing to release the land to be sold, the owner of the rent-charge sometimes assigns it to a trustee upon trust, to receive it exclusively out of the lands intended to remain charged. Another mode is for the annuitant to join in the conveyance of the lands sold, and to add a proviso that the other lands shall continue liable. This plan, however, is open to the objection that as the proviso operates as a new grant, the rent-charge becomes liable to the incumbrances of the owner of the land created before the conveyance. A third mode is for the owner of the rent-charge to covenant not to distrain on the lands sold, but it seems doubtful whether such a covenant does not operate as a release of the rent-charge. If the owner of the rent-charge will not concur, the only plan seems to be for the vendor to covenant with the purchaser that the lands not sold shall be exclusively liable, and give an indemnity against the rent-charge.

By the common law, if a lessor who was tenant for life died within the half-year at the end of which rent was due upon a lease which determined on the death of the tenant for life, his personal representatives could not claim an apportionment of the rent, nor could the remainder-man or reversioner claim that portion which accrued during the life of the tenant for life.

It was, however, enacted by the stat. 11 Geo. II. c. 19, s. 15, that where a lessor tenant for life died before the rent-day, his executors might recover from the tenant a proportionate part of the rent. But this statute did not provide for all the cases that arose; and accordingly the 4 & 5 Wm. IV. c. 22, was enacted, the object of which is to apply the principle of equitable apportionment to all periodical and fixed money payments, between the personal representatives of a deceased person who was entitled to the land, and the person who is entitled to it after his death. The act extends to Great Britain and Ireland.

But it seems doubtful whether the second section of this act will apply to an annuity payable at certain periods and determinable at the death of the grantor, because, if the annuity cease by the death of the grantor before the day of payment, the 'entire portion' can never become payable; and the second section only gives the power of recovering the money, when 'the entire portion' becomes due. It is advisable therefore to retain the usual apportionment clause in the grants of such annuities.

Rights of common are apportionable in certain cases. Common of pasture where it is appendant may be apportioned, either where the commoner purchases a part of the land in which he has the right of common, or upon an alienation of part of the land to which the right is appendant. In the case of common of pasture appurtenant, there will be apportionment in the second case, but not in the first.

APPRAISEMENT (from the French) *aprécier*, *appriser*, or *appraiser*, and remotely from the Latin *pretium*, to set a price upon an article). When goods have been taken under a distress for rent, it is necessary, in order to enable the landlord to sell them according to the provisions of the statute 2 William and Mary, sess. i. c. 5, that they should be previously appraised or valued by two appraisers. These appraisers are sworn by the sheriff, under-sheriff, or constable, to appraise the goods truly according to the best of their understanding. After such an appraisement has been made, the landlord may proceed to sell the goods for the best price that can be procured. By the statute 48 Geo. III. c. 140, an *ad valorem* stamp duty was imposed upon appraisements.

APPRAISERS (French, *apréciateurs*) are persons employed to value property. By the statute 46 Geo. III. c. 43, it was first required that any person exercising the calling of an appraiser should annually take out a licence to act as such, stating his name and place of abode, and signed by two commissioners of stamps. By the same statute a stamp duty of 6*s.* was imposed upon such licences; and unlicensed persons were forbidden to act as appraisers under a penalty of 50*l.* The duty imposed by the General Stamp Act, 55 Geo. III. c. 104, is 10*s.* The number of licensed appraisers in London is about nine hundred, and in other parts of England and Wales there are about seventeen hundred.

APPRENTICE (from the French *apprenti*, which is from the verb *apprendre*, to learn), signifies a person who is bound by indenture to serve a master for a certain term, and receives, in return for his services, instruction in his master's profession, art, or occupation. In addition to this, the master is often bound to provide food and clothing for the apprentice, and sometimes to pay him small wages; but the master often receives a premium.

The system of apprenticeship in modern Europe is said to have grown up with the system of associating and incorporating handicraft trades in the twelfth century. These corporations, it is said, were formed for the purpose of resisting the oppression of the feudal lords, and the union of artisans in various bodies must have enabled them to act with more effect. The restraint of free competition, the maintenance of peculiar privileges, and the limitation of the numbers of such as should participate in them, were the main results to which these institutions tended. To exercise a trade, it was necessary to be free of the company or fraternity of that trade; and as the principal if not the only mode of acquiring this freedom in early times was by serving an apprenticeship to a member of the body, it became easy to limit the numbers admitted to this privilege, either indirectly by the length of apprenticeship required, or more immediately by limiting the number of apprentices to be taken by each master. In agriculture, apprenticeship, though in some comparatively later instances encouraged by positive laws, has never prevailed to any great extent. The tendency to association indeed is not strong among the agricultural population, combination being to the scattered inhabitants of the country inconvenient and often impracticable; whereas the inhabitants of towns are by their very position invited to it.

Since the twelfth century, apprenticeship has prevailed in almost every part of Europe—in France, Germany, Italy, and Spain, and probably in other countries. It is asserted by Adam Smith, that seven years seem once to have been all over Europe the usual term for the duration of apprenticeships in most trades. There seems, however, to have been no settled rule on this subject, for there is abundant evidence that the custom in this respect varied even in different incorporated trades in the same town.

Neither in Ireland nor in Scotland have the laws relating to associated trades or apprentices been very rigorously enforced. In Ireland the same system of guilds and companies certainly existed; but, as it was the policy of the English government to encourage settlers there, little attention was paid to their exclusive privileges; and in 1672 the lord-lieutenant and council, under authority of an act of parliament, issued a set of rules and regulations for all the walled towns in Ireland, by which any foreigner was allowed to become free of the guilds and fraternities of tradesmen on payment of a fine of 20*s*. A statute containing very similar enactments was passed in 19 George III. The term of apprenticeship, also, in Ireland, was of a moderate length, five years being required by 2 Anne, c. 4, for the linen manufacture, which by 10 George I. c. 2, was reduced to four years. It is asserted by Adam Smith, that there is no country in Europe in which corporation laws have been so little oppressive as in Scotland. Three years are there a common term of apprenticeship, even in the nicer trades; but the custom is different in different communities.

In England the institution of apprenticeship is of very old date, being probably contemporaneous with the formation of the guilds or companies of tradesmen. In the statutes of the realm, however, there is no reference to such an institution for about 200 years after the guilds are known to have existed, apprentices being first incidentally noticed in an act (12 Rich. II. c. 3) passed in 1388. In the act (8 Henry VI. c. 11), the putting and taking of apprentices are stated to have been at that time a custom of London time out of mind. A statute, 5 Elizabeth, c. 4, fixed the term of apprenticeship at seven years, and contained numerous provisions. This statute was repealed in 1814 by 54 Geo. III. c. 96.

The apprentice laws were enacted at a time when the impolicy of such legislation was not perceived. But opinion gradually became opposed to these enactments, and the judges interpreted the law favourably to freedom of trade. Accordingly the decisions of the courts tended rather to confine than to extend the effect of the statute of Elizabeth, and thus the operation of it was limited to market-towns, and to those crafts, mysteries, and occupations which were in existence at the time it was passed. And although, in consequence of this doctrine, many absurd decisions were made, yet the exclusion of some manufactures, and particularly of the principal ones of Manchester and Birmingham, from the operation of the act, had probably a favourable effect in causing it to be less strictly enforced even against those who were held to be liable to it. It was proved before a committee of the House of Commons in 1814, that the provisions of the statute of Elizabeth neither were nor could be carried into effect in our improved state of trade and manufactures. The result of the inquiry and of a petition was the act (54 Geo. III. c. 96) by which the section of that statute which enacts that no person shall exercise any art, mystery, or manual occupation without having served a seven years' apprenticeship to it, was wholly repealed. There is in the act of 54 Geo. III. c. 96, a reservation in favour of the customs and bye-laws of the city of London, and of other cities, and of corporations and companies lawfully constituted.

Apprenticeship, though no longer legally necessary (except in a few cases), still continues to be the usual mode of learning a trade or art, and contracts of apprenticeship are very common. By common law, a person under the age of twenty-one years cannot bind himself apprentice so as to entitle his master to an action of covenant for leaving his service or other breaches of the indenture. The statute 5 Eliz. c. 4, ss. 42 and 43, enacts that every person bound by indenture according to the statute, although within the age of twenty-one, shall be bound as amply, to every intent, as if he were of full age. But by these words of the statute the infant is not so bound that an action can be maintained against him upon any covenant of the indenture; and it has therefore been a common practice for a relation or friend to be joined as a contracting party in the indenture, who engages for the faithful discharge of the agreement. But by the custom of London, an infant, unmarried, and above the age of fourteen, may bind himself apprentice to a freeman of London.

By the statute 43 Eliz. c. 2, s. 4, the churchwardens and overseers of a parish, with the assent of two justices of the peace, might bind children of paupers apprentices till the age of twenty-four; but by 18 Geo. III. c. 47, they could not be retained as apprentices beyond their 21st year. The 7 & 8 Vict. c. 112, s. 32, enacts that overseers of the poor, or other persons having the authority of overseers of the poor, in and for any district, union, parish, township, or place in the United Kingdom, may put out as an apprentice in the British merchant sea-service, any boy who is twelve years of age and of sufficient health and strength, with his consent, who, or his parent or parents, is or are chargeable to or maintained by such district, &c., or who shall beg for alms therein: the apprenticeship is to last till such boy attain the age of twenty-one years, or shall have served seven years as an apprentice, whichever shall first happen. Section 33 of the same act provides for turning over, with their consent, of parish apprentices, who shall have been bound to a service on shore, to the sea-service, to be employed as is provided in the case of apprentices to the sea-service under s. 32, for the period then remaining unexpired of their apprenticeship. Section 37 provides that all British ships of the burden of eighty tons and upwards, except pleasure-yachts, shall have apprentices in proportion to their

tonnage, as in this section provided; all which apprentices must at the time of being bound to British subjects be above twelve and under seventeen years of age, and be duly bound for four years at least. By 4 & 5 Will. IV. c. 76, s. 61, justices must certify that the rules of the Poor-Law Commissioners as to the binding of parish apprentices have been complied with, which rules were issued in a general order, dated Dec. 31, 1844. In 7 & 8 Vict. c. 101, for the further amendment of the Poor Law, the Commissioners are invested with the power of carrying out certain matters relating to parish apprentices. There is a clause in the act abolishing compulsory apprenticeship. In 1842 an act was passed which extends the power of magistrates to adjudicate in cases in which no premium has been paid. (5 Vict. c. 7.) A settlement is gained by apprentices in the parish where they last resided forty days in service (13 & 14 Charles II. c. 12), with certain exceptions declared in 12 Anne, cap. 18, s. 2, and 4 & 5 Wm. IV. c. 76, s. 67. By 5 & 6 Vict. c. 99, all indentures whereby females are bound to work in mines are void.

An indenture cannot be assigned over, either by common law or equity, but by custom it may. Parish apprentices may also (32 Geo. III. c. 57, s. 7) with the consent of two justices, be assigned over by indorsement on the indentures.

An indenture is determinable by the consent of all the parties to it; it is also determined by the death of the master. But if there is any covenant for maintenance the executor is bound to discharge this as far as he has assets. By the custom of London, if the master of an apprentice die, the service must be continued with the widow, if she continue to carry on the trade. In other cases it is incumbent on the executor to put the apprentice to another master of the same trade. By the Bankrupt Act, 6 Geo. IV. c. 16, s. 49, it is enacted, that the issuing of a commission against a master shall be a complete discharge of an indenture of apprenticeship; and where an apprentice-fee has been paid to the bankrupt, the Commissioners are authorized to order any sum to be paid out of the estate for the use of the apprentice which they may think reasonable. A duty on apprentices' indentures, varying with the premium, was first imposed by 8 Anne, c. 9.

A master may moderately chastise his apprentice for misbehaviour; but he cannot discharge him. If he has any complaint against him, or the apprentice against his master, on application of either party to the sessions, by 5 Eliz. c. 4, or to two justices in the case of a parish apprentice, by 20 Geo. II. c. 19, and other acts, a power is given to punish or to discharge the apprentice, and in some cases to fine the master. If any apprentice, whose premium does not exceed 10*l*., run away from his master, he may be compelled (6 Geo. III. c. 25) to serve beyond his term for the time which he absented himself, or make suitable satisfaction, or be imprisoned for three months. If he enters another person's service, his master is entitled to his earnings, and he may bring an action against any one who has enticed him away.

We cannot fairly judge the institution of apprenticeship, without an accurate examination of the circumstances under which it arose. That it had its uses cannot be doubted, and the continuance of the practice in this country, since it has ceased to be required by law, is some evidence in favour of the institution. Except in the case of surgeons and apothecaries, proctors, solicitors, attorneys, and notaries, there is now no apprenticeship required by law in England.

The impolicy of the old apprentice laws as they existed in France and England has been shown by many writers (Droz, 'Economie Politique,' p. 114, &c.; Adam Smith, 'Wealth of Nations,' book i. chap. 10).

APPRISING. [Adjudication.]

APPROACHES. This term is applied to the covered-roads which are made by a besieging army, from the depôts of materials, sometimes as far as the foot of the breach made in the rampart of the fortress. They are mostly in zig-zag or oblique directions, crossing and re-crossing the prolonged capitals of the works attacked in order that they may not be enfiladed by the defenders; and they consist generally of trenches excavated in the ground, the earth being thrown towards the fortress in order to protect the men in them from the direct fire. Occasionally, as on rocky or marshy ground, they consist merely of covering masses formed of earth brought to the spot in bags, stuffed gabions, wool-packs, or any other bulky objects which can be obtained.

APPROPRIATION. [Advowson; Benefice.]

APPROPRIATION. [Payment.]

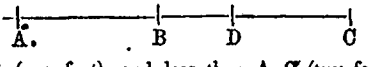
APPROVER. By the old English law, when a person who had been arrested, imprisoned, and indicted for treason or felony, confessed the crime charged in the indictment, and was admitted by the court to reveal on oath the accomplices of his guilt, he was called an *approver*.

APPROXIMATION, from the Latin, signifies a *drawing near to*. In mathematics, results are said to be found by approximation, when the process employed gives nearly, but not exactly, the result required.

Strictly speaking, the observed phenomena in every branch of experimental philosophy are approximations, more or less near, to the truth. Thus the distance of the sun, or the diameter of a planet, are only known approximately: but general custom does not sanction the application of the term to any 'drawing near' in which the imperfection arises from error of the senses, or of instruments. It is only when the defects of mathematical analysis oblige us to be content with a formula which gives results only nearly true, that the latter are said to be approximate. To this part of the subject, then, we confine ourselves.

It may be stated as a general fact, that there are very few mathematical processes which give absolutely correct determinations, in which the answer obtained is neither more nor less than is necessary to satisfy the conditions of the question. But the fault is not in the processes themselves, but in the problems which it is necessary

to submit to them, and in the nature of arithmetical, as distinguished from geometrical, magnitude. It is worth while briefly to elucidate this point. In geometry, the mind conceives one line or angle to differ from another by some magnitude of the same kind which can be *assigned*, and a magnitude is rather imagined to be given, than actually given. If we attempt to *construct* the line or angle of geometry, we must have recourse to approximation, and that of the roughest character, since the errors are as great as those of the senses. It is only by laying down the postulate that any line or angle can be assigned independently of all mechanical methods, that geometry becomes, mentally, a science of absolute exactness. In arithmetic, on the contrary, the very first notion of numbers throws a theoretical difficulty in the way. We can imagine a line to grow or increase *continuously*, that is, in such a way that it shall not increase from one to two feet, without previously assuming every possible length which lies between one and two feet. This idea is forced upon us whenever we see points moving to or from each other. But is it therefore true, that every possible length which is greater than one foot and less than two, can be expressed by one foot and some determinate numerical fraction of a foot? This question reduces itself to the following. Let A D be greater than



A B (one foot), and less than A C (two feet); if B C be successively divided into two equal parts, three equal parts, four equal parts, and so on, *ad infinitum*, does it follow that some one or other of the subdivisions must of necessity fall upon the point D, previously taken at hazard? If we appealed to the evidence of the senses, we should certainly answer in the affirmative, for, though the finest compasses were used, we should soon find some point of subdivision so near to D, as not to be distinguishable from it by the severest test our senses could apply. But our mechanical points are minute solids, while the mathematical point has neither length, breadth, nor thickness. Conceive the latter, and the affirmative answer does not appear self-evident; for, though the continuation of the points of subdivision is unlimited, the number of points which can be taken in the line is also unlimited. And we can demonstrably answer the question in the negative [INCOMMENSURABLE]; as an instance, either let B D be equal to the side of that square of which B C is the diagonal, or let B C be the circumference of that circle of which B D is the diameter. In neither case can one of the subdivisions of B C ever fall on D.

Here then is a fruitful source of the necessity of having recourse to approximation, since we cannot be sure that any required relation between concrete magnitudes is absolutely expressible in numbers. In fact, we may state the following as a result of experience, though, not so far as we know, capable of demonstration:—numbers being taken at hazard, and submitted to any process which requires the solution of an equation higher than the first degree, the odds are greater than can be assigned against obtaining an absolute result without approximation. In a common table of logarithms, fixing at hazard upon any number, the odds are nearly seventeen thousand to one against choosing a number of which the logarithm can be exactly given.

This would appear to throw an air of uncertainty over almost all the conclusions of pure mathematics, and justly so, if it were not for the following truth, which, except so far as the labour of approximation is concerned, renders it practically immaterial whether a result be obtained exactly, or by approximation. Any equation whatsoever, which expresses the conditions of a possible problem, if not capable of exact solution, may yet be so far satisfied that a number or fraction can be found, which, on being tried in the given equation, shall produce an error smaller than any we may think it necessary to name at the outset. For instance, the ratio which the circumference of a circle bears to its diameter does not admit of an exact and absolute determination. If any two numbers be named, their ratio is either too great or too small. But supposing it asked to determine the circumference of a circle from its diameter so nearly, that the error shall not be so much as a foot for every hundred miles of diameter. It can be shown to be more than sufficient for this purpose to multiply the diameter by 355 and divide by 113; which, if the diameter were 100 miles, would give 314 miles, 280 yards, and one foot: this, though too small, is within the conditions of the question, not being too small by one foot. Again, though it is impossible exactly to solve the equation $x^2 = 7$ or $x^2 - 7 = 0$, that is, to find a fraction which, multiplied by itself, shall make 7, yet naming any fraction, however small, at pleasure, for example, one millionth or ·000001, it is possible so to determine x, that $x^2 - 7$, though not absolutely *nothing*, shall be less than the proposed fraction, one-millionth.

APRICOT is a well-known fruit, cultivated commonly in this and other European countries. The old English name is *aprecoke*, of which apricot is probably a corruption. Like many other domesticated plants, the native country of the apricot tree is unknown: from the name it bore among the Romans, *Armeniaca*, it would appear to have been a native of Armenia, to which country it is in fact assigned by both Pliny and Columella.

As a domestic fruit-tree in the climate of England, the apricot is a plant of less importance than many others; the early season at which it blossoms causes it to be peculiarly subject to the effect of spring-frosts, so that a crop of its fruit is very precarious. It is, however, much cultivated.

Apricots in this country are produced either upon open standard trees, or upon walls with a westerly aspect; an eastern exposure is extremely unfavourable to them, at least on the east side of the island. The fruit produced upon walls is the finest, but that from standards is by far the best flavoured. Of the kinds that are cultivated upon walls there are only three that are much worth having, namely, the Orange for preserving, and the

Moorpark and Turkey for the table; several others are to be met with in nurserymen's catalogues, but they are of little importance.

The rules for training the apricot are essentially the same as those for the peach. [PEACH.]

A'PRIES, an Egyptian king, the son of Psammis (Herod. ii. 161), otherwise called Psammúthis; he was the eighth king of the twenty-sixth dynasty (Eusebius), or the seventh according to Africanus. He appears in the Hebrew history under the name of Pharaoh Hophra (Jeremiah xliv. 30). Apries succeeded his father B.C. 593, and reigned twenty-five years. Early in his reign (B.C. 586) Jerusalem was plundered by Nebuchadnezzar; after which a great number of the people of Judah took refuge in Egypt, under the conduct of Johanan, who carried the prophet Jeremiah with him to Tahpanhes (Daphnæ), then the residence of the Egyptian king. Apries made an expedition against Cyprus, and had a naval engagement with the Tyrians. Near the close of his reign he sent an army against the Greeks of Cyréne, which was defeated with great loss. This caused a revolt among the Egyptians, which ended in the dethronement and execution of Apries about B.C. 569, or 568. [AMASIS.] He was buried in the tombs near the great temple of Athenæa at Sais, where his ancestors of the Saite dynasty were interred. (Herod. ii. 169.)

APRIL, the fourth month of the year, consists of thirty days, which was the number said to be assigned to it by Romulus. Numa Pompilius deprived it of one day, which Julius Cæsar restored, and which it has ever since retained. In the original Alban or Latin Calendar, April held the first station, and then consisted of thirty-six days. Its name is usually considered to have been derived from *aperire*, to open; either from the opening of the buds, or of the bosom of the earth in producing vegetation. The Anglo-Saxons called it *Ooster* or *Easter-Monath*. In this month the sun travels through parts of the signs of Aries and Taurus, that is to say, of those parts of the ecliptic which astronomers designate by those names. The real motion of the sun among the constellations is through parts of Pisces and Aries. [PRECESSION; ZODIAC.]

APRIL CEREMONIES. The custom of making fools on the first of April is a practice well known in England, France, Sweden, and probably in other countries of Europe; and it is believed to be connected with an immemorial custom among the Hindoos held near the same period in India, toward the end of March, called the Huli Festival, when mirth and festivity reign among the Hindoos of every class, and people are sent upon errands and expeditions which end in disappointment, and raise a laugh at the expense of the person sent. ('Asiatic Researches,' vol. ii. p. 334.) In England, the first of April is usually termed 'All Fools' Day,' and the person imposed upon an 'April fool.' In France this person is called a 'Poisson d'Avril,' that is, a mackarel or silly fish; in Scotland 'an April gowk.' Maurice, 'Indian Antiquities,' vol. vi. p. 71, speaks of the Huli Festival as the celebration of the period of the vernal equinox.

A' PRIO'RI and A' POSTERIO'RI, two terms, signifying literally, 'from a thing before,' and 'from a thing after.' These are rather terms of common conversation and writing, than of logic, properly so called; so that they are seldom noticed by writers on that science. The use of them is in general very vague, and the consequence of any attempt to define them very strictly would be either to make out *à priori* reasoning to be altogether impossible, or to throw insuperable difficulties in the way of finding where it ends and the other begins. In common language, we reason *à priori* when we infer the existence of a God from the general difficulties in the supposition of the existence of what we call the creation, on any other hypothesis; but we reason *à posteriori* when we infer the same from marks of intelligent contrivance in this particular creation with which we are acquainted.

The term *à priori* is frequently used in a sense which implies 'previous to any special examination.' As when a sentence begins with '*à priori* we should think,' &c. &c., which in most cases will be found to mean nothing more than an expression of the leaning which the speaker found his mind inclined to, when he had only heard the proposition, and before he had investigated it.

APSENDE'SIA (Lamx.), a genus of Polypiaria, from the great oolite near Bath.

APSIDES, a Greek term, used to signify those points of a planet's orbit in which it is moving at right angles to the line drawn to the primary. These points are also those of greatest and least distance from the primary.

APT. [VAUCLUSE.]

A'PTERAL is a term formed from a Greek compound word signifying 'not having a wing,' or 'without wings;' and in this sense it is applied to a temple which has prostyles, or porticoes of columns projecting from its fronts or ends, but of which the columns do not extend laterally, and run along the flanks from one end to the other, which would make it *peripteral*. The parallelogrammic temples of the Romans were for the most part simply apteral prostyles, and their arrangement has been much more followed in modern works than that of the Greek temples, which are, with few exceptions, peripteral.

A'PTYCHUS (Von Meyer), one of the generic names of a singular fossil, supposed to be the remains of a conchiferous mollusk, or the opercular shell of a cephalopod. Its other names are Trigonellites, Ichthyosiagonites, and Lepadites. The species belong to the ammonitiferous strata, and specimens sometimes occur (as at Solenhofen) in the last chamber of the Ammonites. The structure is fibrous.

APULEIUS, LUCIUS, a Platonic philosopher, lived in the second century, and was born at Madaura in Africa. He studied first at Carthage, then at Athens, and afterwards at Rome, where he acquired the Latin language. He was a man of an inquisitive disposition, especially on religious subjects; and he travelled extensively, and was initiated in the various mysteries by which the peculiar tenets of many religious and philosophical sects were veiled. On his return to Rome, he was

admitted as a priest into the service of Osiris. He practised at Rome for some time as an advocate, and then returned to Africa, where he married a rich widow, by name Pudentilla. But the woman's relations accused him before the proconsul of Africa of gaining her affections by magic. Apuleius made a spirited defence; and his 'Apology,' or 'Oratio de Magia,' still extant, is a curious specimen of the literature of the age. The 'Golden Ass,' otherwise called the 'Metamorphosis,' the best-known work of Apuleius, is a running satire on the absurdities of magic, the crimes of the priesthood, the amorous intrigues of debauchees, and the systematic outrages of thieves and robbers. The episodes are the most valuable portions of the piece; especially that of 'Psyche.' Though the work has great defects, Apuleius has touched many passages with a masterly hand. He wrote numerous works in verse and prose, the greater part of which are lost. Besides his 'Golden Ass' and his 'Apology,' his work 'On the Doctrines of Plato,' his book 'On the God of Socrates,' his treatise 'De Mundo,' which is a translation from Aristotle, and his 'Florida,' have survived. Some of his works have been printed separately. The last edition of Apuleius is by G. F. Hildebrand, Leipzig, 1842. There are several French translations of the 'Golden Ass,' and four Italian, besides translations into Spanish, German, Flemish, and English. W. Adlington's English translation was first printed in 1566. The latest and best English translation is by Thos. Taylor, London, 1822, one vol. 8vo. This volume contains also the treatise 'On the God of Socrates,' and other treatises, with a life of Apuleius prefixed. Some passages of the 'Golden Ass' are omitted in Taylor's version, but they are placed at the end of the book in the complete copies.

APU'LIA, the name of one of the divisions of southern Italy in the time of the Romans. Its limits were—on the E. and N. the Adriatic Sea, on the N.W. the river Frento, or perhaps the Tifernus, which divided it from the Frentani, Samnium on the W., Lucania on the S., and Messapia on the S.E. It does not appear that the Romans ever considered the Messapian peninsula, now called Terra d'Otranto, as part of Apulia. In remoter ages, the whole of this part of Italy was known to the Greeks by the name of Iapygia (Herod. iv. 99), and was inhabited by the Daunii, the Peucetii or Pædiculi, the Messapians, and the Salentini, who were all said to be descendants of Greek or Pelasgic colonies. The original Apulians were probably a tribe of the Opici or Osci. (Niebuhr's 'Hist. of Rome,' vol. i.)

Roman Apulia, in its extended sense, included the countries of the Apuli, the Daunii, and the Peucetii. The islands of Diomedes, now called Tremiti, belonged also to it. The principal towns of Apulia were Teanum, Luceria, Asculum, Argyrippa or Arpi, Sipontum, Salapia, Barium, Egnatia, Canusium, and Venusia, the birthplace of Horace. This country suffered greatly during the second Punic war, when some of its towns sided with Hannibal and others with Rome. The whole finally became subject to the Roman sway. After the fall of the western empire the possession of Apulia was long disputed between the Goths, the Byzantine emperors, the Longobards, and the Saracens. The Normans conquered Apulia in the eleventh century, and the Norman kings of Sicily styled themselves dukes of Apulia and princes of Capua. These two names included the whole of their continental dominions. When afterwards the monarchy was divided into two kingdoms, namely, Sicily *ultra Pharum*, and Sicily *citra Pharum*, the latter vulgarly called the kingdom of Naples, the name of Apulia was definitively limited to one of the four divisions of the continental kingdom, consisting of the Apulia of the Romans and the Messapian peninsula. [PUGLIA.]

APURÉ, River. [ORINOCO.]

APURIMAC, a river in South America, which carries off all the waters that descend from the eastern declivity of the Andes, between 11° and 16° S. lat. Its source is near the N. W. extremity of Lake Titicaca, about 16° S. lat., 72° W. long. At first it runs to the north, but by degrees declines to the north-east, and then to the north-west. In this space its waters are increased by two tributaries, the Calcamayo (150 miles long), and the Villcamayo (220 miles long). Near 12° S. lat. the Apurimac is joined by the Jauja or Xauxa, the largest and most important of its tributaries, about 300 miles long. After its junction with the Xauxa, the Apurimac runs through the plains in a north-eastern direction. After a junction with the Pangoa it is called the Tambo; and, after a later junction with the Parobeni, it is called the Ucayali. Its whole course is about 500 miles, and it empties its waters into the Amazon at about 5° S. lat., 74° W. long.

It does not seem that either the Apurimac or any of its tributaries is adapted to the transport of commodities. Their rapid course in a stony bed between high rocks, and the shallowness of their waters, render them entirely unfit for navigation. The valleys through which they flow, though of considerable length, are rather narrow. Near the sources they are mere crevices and ravines, but lower down they widen to an average breadth of two or three miles, which sometimes extends even to five miles.

The country drained by the Apurimac and its tributaries is the most important and most populous part of Peru. It is still mostly inhabited and cultivated by the industrious descendants of the ancient Peruvians.

APUS (Constellation), from the Greek ἄπους, without feet, used to signify the bird of Paradise, the *avis Indica* of Linnæus, which was formerly believed to have no feet. It is a constellation introduced by Bayer, and lies too near the south pole to be visible in our hemisphere. It is surrounded by Octans, Pavo, Triangulum Australe, and Cameleon.

AQUA REGIA. [CHLORINE.]

AQUA TOFA'NA, a poisonous fluid invented about the middle of the seventeenth century by an Italian woman of the name of Tofana. This woman, who resided first at Palermo, and afterwards at Naples, was one of the most celebrated of a class of persons known under the name of Secret Poisoners [POISONING, SECRET], who in ancient times were believed to possess the power of de-

stroying life at any stated period, from a few hours to a year; and who, during the sixteenth and seventeenth centuries, were regarded in all the nations of Europe with extraordinary terror. In the year 1659, during the pontificate of Alexander VII., it was observed at Rome that many young married women became widows, and that many husbands, suspected to be not agreeable to their wives, died suddenly. The government used great vigilance to detect the poisoners; suspicion at length fell on a society of young wives, whose president appeared to be an old woman, who pretended to foretell future events, and who had often predicted very exactly the death of many persons. By means of a crafty female their practices were detected; the whole society were arrested and put to the torture, and the old woman, whose name was Spara, together with four others, was publicly executed. It appears that Spara, who was a Sicilian, derived her art from Tofana at Palermo, the latter selling the poison, which from hence acquired the name of 'Aqua della Tofana,' in small glass phials with this inscription, 'Manna of St. Nicholas of Barri,' and ornamented with the image of the saint. Though this infamous woman lived to an advanced age, she was at length dragged from a monastery, in which she had taken refuge, and put to the torture. She confessed that she had been instrumental to the death of no less than 600 persons.

AQUAFORTIS. [Nitric Acid.]

AQUA'RIUS (Constellation), the Water-Bearer, one of the twelve zodiacal constellations. Its Greek name is Ὑδροχόος, the Water-Pourer. In the Indian zodiac it is simply a water-jug, the name of which, according to Legentil, is Coumbam, and the same in the Arabic: in the Egyptian, it is a male figure holding two urns, from which the water flows. The mythology of the Greeks refers the Water-Bearer in different places to the fables of Deucalion, Ganymede, Aristæus, and Cecrops. Its probable origin, however, whether we place the origin of the zodiac in India or Egypt, is the watery season of the year in which the sun was in this sign. Dupuis, who supports the latter opinion, thinks that Aquarius as well as Capricornus and Pisces refer to the months of the year during which the inundation of the Nile took place: Legentil, who advocates the former, imagines that they represent the rainy season which is absolutely necessary for the growth of the rice-crops.

The constellation Aquarius may be found in the heavens by producing southward a line drawn through the bright stars in the head of Andromeda and the wing of Pegasus. This line passes through the two brightest stars in Aquarius, α and β, situated in the two shoulders.

AQUATIC ANIMALS. The term 'aquatic animals,' often as it is used, does not convey a very precise idea; it applies equally to fishes which inhabit the water and have the gills or breathing organs constructed for aquatic respiration; to whales which live in the water though they breathe air; and to animals which are in the habit of frequenting the water, of swimming upon it, or of diving in pursuit of prey, as the gannet, the duck tribe, and others among birds, the beaver, the otter, the water-rat, and others among mammalia. Again, some reptiles, as the turtle, the sea-snake, and others, live in the water, though they breathe air, and some only visit the water occasionally, while others avoid it.

Taking the expression in its loose and general acceptation, it leads us to observe that all animals of aquatic habits have their structure more or less modified to fit them for such habits; and this the more, the more truly and exclusively they make the waters of the sea, the lake, or the river, their home; whether they respire air by means of lungs, or water by means of gills, vibratile cilia, or any other apparatus.

The greater part of the lower orders of the invertebrate classes are truly aquatic, and formed for the respiration of water, such as the zoophytes, the polygastric animalcules, and acalephæ or jelly fish: their delicate structure suffused with fluid would be soon dried up by the action of the sun and air, and they would speedily perish; nor unless in a fluid medium could those which are capable of locomotion shift from place to place. Even the echinodermata, defended by a semi-crustaceous envelope, and which are capable of creeping on rocks, or burying themselves in the sand, are essentially formed for living in the water. So are many of the annelides, and though the earth-worm inhabits the ground, it prefers humid soils, and perishes if exposed to the sun. The crustacea generally are aquatic. Many of these, as the crab, crawl on stout limbs at the bottom of the water, but many have the limbs formed like paddles, and thus row themselves along; the lobster takes long sweeps backwards, by striking the water with the tail, and hinder portion of the body, which is extremely muscular.

The cuttle-fish are all aquatic. They crawl on their flexible but powerful limbs, furnished with suckers, at the bottom of the sea, and dart along by throwing a jet of water from the funnel or siphon of their branchial chamber, aided by fin-like expansions of the mantle (in such as possess these flippers). The greater number of the shelled mollusks and all the tunicate mollusks are aquatic. The univalve mollusks mostly creep like land-snails. Of the bivalve mollusks, many appear to be incapable of locomotion; others, like the sea and the fresh-water muscle, raise themselves on their edge, and by means of a tongue-like foot or limb urge themselves along by a series of impulses. The cockle can leap to a distance of several inches, and bury itself in the sands by means of the same instrument. The scallop effects a backward progression by smartly flapping the valves of the shell together, a series of jerks being the result of their action. All the bivalve mollusks are aquatic.

When we look at the vertebrata we find one great and extensive class, the fishes, exclusively formed for inhabiting a fluid medium; they respire by means of gills, they are covered with imbricated glossy scales, their form is elongated and compressed, the eye is adapted to the dense medium in which they live and follow their prey; they are duly balanced by means of fins; their

tail is struck laterally, that is, from side to side, and forms a powerful paddle.

Among reptiles, crocodiles and turtles, though they come on shore to lay their eggs, may be regarded as truly aquatic, excepting in as far as they respire air. The great organ of aquatic locomotion in the crocodile, is the huge compressed and muscular tail, with which the animal lashes the water from side to side with great violence. On the contrary the turtle uses its ample flippers in the same manner as a rook does its wings in the air, gently flapping them, and so glides buoyantly along. Many of the tortoises which frequent fresh-water have webbed feet. The sea-snakes have the caudal portion of their body compressed, and swim like eels. Aquatic birds are characterized, except in a few instances, as the water ouzel, &c., by having the toes webbed, oared, or lobated; in the oar-footed grebes, and the web-footed auks, razor-bills, and puffins, so expressly formed for diving and swimming, the boat-shaped body is covered with dense plumage impenetrable by water, the legs are thrown as far backwards as possible, in order that each stroke may tell upon the whole body, and the wings are used as oars in their subaquatic evolutions. The cormorant uses its wings as it pursues its finny prey, and by means of its stiff tail, which like that of the whale and beaver acts vertically and not from side to side, it dives with marvellous celerity, disappearing in a moment. Of the natatorial birds generally, as the geese, ducks, gannets, gulls, pelicans, &c., little need be said; their structural fitness for swimming and diving is too palpable to be misunderstood. Of all aquatic birds, the penguins best deserve that title; on the land they are as awkward as seals, in the water as active and as much at home; their wings are true flippers; their legs are placed at the extremity of the body; their plumage is dense; their bones are solid and heavy; and they swim submerged, except the head and neck.

Among mammalia, the whales, porpoises, dugongs, and lamantins, are the most truly aquatic; they are born in the wide sea, and there they exist. The skin is smooth and oily; beneath it a layer of blubber defends the internal viscera; and the venous and arterial systems are, by a peculiar plexiform arrangement, so constructed as to permit a long cessation of respiration while the animal is submerged in the water. The cachalot can remain under water for three quarters of an hour and upwards, without being obliged to rise for breath. In these animals the fore limbs are converted into flippers, the hind limbs are wanting; the tail is conical, powerful, and muscular, and terminates in a broad horizontal paddle. Next to the whales, as aquatic animals, we may place the walruses and seals. These are covered with short close stiff hair; the fore limbs are formed into paddles, the hind limbs are placed as far backwards as possible, and are also paddles or oars; the form of the body is conical, and every part of the internal structure is saturated with oil. These animals obtain their food in the sea, but they breed and repose on rocks, or on desolate shores; their action on land is awkward and shuffling; they shove themselves along, and seek safety in the water.

With respect to the others, they are web-footed, and only visit the water in quest of prey. The beaver is really more aquatic; its large flat caudal paddle is used as a rudder in diving and reascending, and its limbs are constructed for aquatic rather than terrestrial progression.

Thus then, as we have observed, the term *aquatic* as applied to animals is of vague signification. We call crabs, lobsters, bivalve mollusks, cuttle-fish, and fishes, aquatic; they are truly so; they respire water. We call whales aquatic; they are so in a modified sense, for they respire air; but seals, otters, beavers, &c., though they habitually frequent the water and are expressly formed for progression in it, are not truly aquatic; they repose, they breed, they rest, upon the land. Thus when we speak of *aquatic* mammalia, including under the term whales, otters, and beavers, how widely separated, in form, structure, habits, and instinct, are the species thus designated; and how much more so, if we extend the term, and say *aquatic animals*.

AQUATIC PLANTS, in horticulture, are those which are naturally found floating in deep water, and are carefully distinguished by the cultivator from mere marsh plants. The management of them when they are hardy is of the simplest kind, nothing being necessary beyond planting them in boxes with holes in the sides, and sinking them three or four feet below the surface of a pond, so that the boxes lie upon, or among the mud at the bottom.

But for those which demand the protection of the stove or greenhouse, some additional precautions appear requisite. If left to themselves in such situations, the uniformity of temperature is such as to deprive them in some measure of the repose that they naturally receive from the alternation of seasons: kept constantly in a growing state, their excitability is gradually destroyed, and death ensues as a matter of course.

Various methods of treating such plants have been recommended; but they all depend for their success upon keeping in view the principle of periodical rest and rapid growth under a high temperature, with little air during the season of vegetation.

Some very good practical observations on the management of both hardy and tender aquatics have been given by Mr. Kent, in the 3rd volume of the 'Horticultural Transactions.'

AQUATINTA ENGRAVING. The word *aquatinta* is a compound of two Latin words, *aqua* (water) and *tinctus* (stained), by which is implied that this mode of engraving is an imitation of water-colour or India-ink drawings. The inventor, a German artist named Le Prince, was born at Metz in 1723. His method was to sift black resin over a clean copper plate; the resin was fixed by a moderate heat sufficient to make the dust adhere without fluxing or becoming an even varnish: he thus formed a granulated surface on the plate, usually called a *ground*, which suffered very little from the action of the diluted acid, yet allowed it to corrode very freely in the small spaces left be-

tween the grains of the resin. Mrs. Catherine Prestel, also a German, improved much upon the meagre works of Le Prince, and executed several large works with so much success, that little more was found wanting than a ground that would adhere better to the plate and yield a greater number of impressions; this was effected by dissolving the resin in alcohol, and then pouring the mixture over the plate, the quantity of resin determining the coarseness or fineness of the grain. The modern aquatinters have another advantage over their predecessors in using a composition for painting the forms of leaves of trees, or other objects, where the trouble of surrounding the forms by a varnish would be too great. This composition is made of treacle, whiting, and gum. When used, it must be thoroughly dry before the varnish is passed over it; the varnish also must be allowed time to dry; after which, cold water poured on the plate will in a few minutes bring off all the composition and the varnish which had passed over it, leaving the forms perfect, and the ground in those places free to receive the acid again. The remainder of the plate is permanently *stopped out* by a resinous varnish; with this also the margin of the plate is to be varnished, leaving a narrow strip of the ground for trials or tests. The design intended to be engraved is then made on the ground; this is done in the following manner:—The design is first copied on very thin transparent paper, called tracing-paper; between this tracing and the prepared ground on the plate a thin sheet of paper is placed, which has been rubbed over with lamp-black or vermilion, and sweet oil; every line of the design is then gone over with an instrument called a blunt point, with a moderate pressure, and is thus transferred to the ground so securely that the acid cannot destroy it.

Before the acid is poured on the plate, a border or wall of wax (formed of burgundy pitch, bees' wax, and sweet oil), about an inch in depth, is placed round the margin of the plate.

The plate being so far made ready, the completion of the design is resumed by stopping out the highest lights on the edges of clouds, water, &c., with a varnish of Canada balsam, oxide of bismuth, and turpentine. Next pour on diluted aquafortis; let it remain, according to its strength, from half a minute to a minute, then pour it off, and wash the plate three or four times with clean water, and dry it with a clean linen cloth or a pair of bellows. If on trying the strip the tint is found not to be sufficient, repeat the acid for another half minute, and then proceed. The colour of the bismuth varnish must be changed for the second stopping out, by adding a little chrome-yellow, vermilion, or lamp-black, or any other colour that is not destroyed by the acid. The colour is to be changed after each application of the acid, that the engraver may remember in what places he has carried forward his work, what tints have been softened at their edges, &c. The acid should be strengthened a very little after each application. When the ground changes to a grey colour it is beginning to fail, and must be taken off by heating the plate till the bordering wax will lift off; after this, sweet oil is applied to the whole surface, and a brisk heat beneath the plate will bring off all the different varnishes with a linen cloth; then an oil rubber, made of fine woollen cloth, rolled up hard and the end cut off, applied with sweet oil, will take out the stains; tints which are too strong may be softened or even rubbed out. The plate is now cleaned with spirits of turpentine and sent to the printer to prove, after which it is to be exceedingly well cleaned with turpentine, &c., and another ground laid; this should be done in such a manner as to make the grains fall exactly on the granulations of the former ground, which is called *re-biting*. It is done by making the ground much stronger than the one used before. The process for the second ground is the same as for the first; retouching with the acid those tints which require more depth, and stopping out those parts that are sufficiently dark. Another proof must be taken, and the plate then finished with the burnisher, which some use with oil, but others prefer to use dry, previously filling the whole plate with powdered white lead, by which it can be seen how much has been burnished down according to the quantity of colour left in the plate.

AQUEDUCT, or AQUÆDUCT (*aquæ ductus*), as it was formerly more correctly written, is composed of two Latin words, *aqua*, in the genitive case *aquæ*, and *ductus*, signifying together a conductor or conduit of water. In this, its more extended sense, the term aqueduct may be applied to all sorts of pipes and channels for the conveyance of water, but it is commonly restricted to constructions formed above the surface of the ground for the purpose of conveying streams of water in a regularly but slightly descending current across valleys and over plains, from one comparatively high point to another, following a winding course when the descent in a direct course would be too rapid. Though we have not in this country an example of the sort of structure which the term designates, it may be exemplified by such erections as Barton Bridge, in Lancashire, which carries the Duke of Bridgewater's canal over the river Irwell; the bridge which carries the Edinburgh and Glasgow Union Canal over the valley of the water of Leith at Slateford; and the numerous railway viaducts erected of late. The former of these have been sometimes called aqueducts, but this application of the term only leads to confusion, unless *bridge* be superadded; structures for the purpose of carrying a canal are indeed more strictly viaducts than aqueducts. Nevertheless, such is the form and structure of an aqueduct—a series of piers equi-distant, or nearly so, with arches connecting their heads to form one continuous and nearly level line, on the back of which is the channel or water-course. This, in Roman aqueducts, was either arched over, or covered with a flat stone coping.

Contrivances for the conveyance of water from a distant source for the supply of a city are of great antiquity. Herodotus (iii. 60) describes the mode in which Eupalinus, an architect of Mégara, supplied the city of Samos with water, by a tunnel seven stadia or 4200 Greek feet long, through a hill 900 Greek feet high.

Aqueducts were most extensively used by the Romans, and in the vicinities of many of their

more important cities, in Asia and Africa, as well as in Europe, remains of extensive constructions of the kind yet exist.

Rome itself was supplied with water from sources varying from 30 to 60 miles in distance, and at one period of its history no less than twenty aqueducts brought as many different streams of water across the wide plain or Campagna in which the city stands. Great portions of the distance were of course in every case occupied by artificial channels winding along the sides of hills and mountains; and long tunnels carried the streams through these natural barriers when occasion required; but nevertheless the arcaded duct led the streams across the deep valleys, and the aqueduct was in every case required to carry it onwards from the hills over the wide plain into reservoirs in Rome. In one of these Roman aqueducts the series of arches is calculated at nearly 7000, their height being in many places more than a hundred feet. There is nothing more interesting or more really beautiful in the existing ruins of ancient Rome than the remains of these splendid works, three of which, having been restored and repaired, supply the modern city abundantly.

Sextus Julius Frontinus, who was inspector of the aqueducts of Rome under the Emperor Nerva, has left a treatise on this subject, which contains much valuable information.

The most celebrated modern aqueducts are that of Caserta in the kingdom of Naples, of Maintenon near Versailles in France, and that of Bemfica, called *Agoas Livres*, near Lisbon in Portugal.

AQUIBA, or *Akibah ben Joseph*, lived at the end of the first and at the beginning of the second century A.D., and was president of the academy at Lydda and Tabae, as disciple and successor of Rabbi Gamaliel. The Jews assert that things which were unknown to Moses were revealed unto Akibah. The Emperor Hadrian, in whose time an insurrection in Judea took place, in which Akibah took part, put many Jews to death, and ordered Akibah to be killed by iron combs, with which his skin was taken off. Akibah was buried in Tiberias.

AQUIFOLIA'CEÆ (from *aqua*, 'water,' and *folium*, 'leaf'), a natural order of exogenous plants.

This order, which is named after the *Ilex aquifolium*, the common holly [ILEX], was included by Jussieu in Rhamnaceæ. It has however been well characterized by Brongniart, in his memoir upon Rhamneous plants, under the name *Ilicineæ*.

Ilex is remarkable for yielding in one of its species, *I. Paraguensis*, the alkaloid *theine*, the same principle that is found in the *Thea Chinensis*. [TEA, PARAGUAY.]

Prinos glaber is a low handsome shrub, with white flowers and a black fruit; hence it is called, in Jersey, ink-berries. It is a native of North America, from Canada to Florida. Its leaves are said to be a good substitute for those of the Paraguay tea-plant, and are used for making tea.

There are several other species of Prinos, some of which are hardy, and well adapted for shrubberies.

AQUILA. [ABRUZZO.]

A'QUILA was, according to Epiphanius, a relative of the Emperor Hadrian, and converted from idolatry to Christianity, but afterwards excommunicated on account of his idolatrous astrology. He embraced Judaism, was circumcised, and translated the Old Testament literally into Greek. The Jews preferred his translation to the Septuagint. It appears also from Irenæus, that the Ebionites used the translation of Aquila in order to support their Judaizing tenets. The remains of this translation have been edited by Montfaucon, Martianay, and others, in the 'Hexapla' of Origen.

A'QUILA, JULIUS, a Roman jurist, whose period is uncertain. He is one of the writers who were used for the compilation of the Digest [JUSTINIAN'S LEGISLATION]; but the Digest contains only two excerpts from him, both of which belong to his 'Book of Answers'—'Liber Responsorum' ('Dig.' 26, tit. 7, s. 34; tit. 10, s. 12). He is called Gallus Aquila in the Florentine Index.

A'QUILA (the Eagle), a constellation situated above, so as to rest on, Capricornus and Aquarius. It may be readily found by means of the head of Draco and the bright star α Lyræ; since a line passing between β and γ Draconis, and through α Lyræ, passes through a bright star of the first magnitude, α Aquilæ, cutting also two stars of the third magnitude, β and γ, situated directly above and below α. This constellation is on the meridian at 8 o'clock, P.M. in the middle of September, at about 40° of elevation.

In the Greek mythology this constellation represents the eagle of Jupiter. According to some, it is the bird which was the tormentor of Prometheus. M. Dupuis conjectures, but with very little probability, that the name was given when Aquila was near the summer solstice, and that the bird of highest flight was chosen to express the greatest elevation of the sun.

The constellation Antinoüs is usually considered as a part of Aquila, and is treated as such in catalogues. It is represented as a boy in the grasp of the eagle, and its principal stars are η, θ, ι, $\varkappa$, and λ. It is said to have been placed in the heavens by order of the Emperor Hadrian, in memory of Antinous. [ANTINOUS.] Others have supposed it to refer to the fabulous history of Ganymede, who was carried to heaven by the eagle of Jupiter; but this is rendered unlikely by the silence of Ptolemæus, who, though he speaks of the groups of stars in question, does not call them the constellation Antinous, but simply 'unformed stars, among which is Antinous.' Had the two figures originally contained any reference to the mythology above alluded to, it is most probable that the constellation would have been regularly distinguished long before the time of Ptolemæus.

AQUILARIA'CEÆ, a small natural order of plants belonging to the group of incomplete exogens. The species are trees with smooth branches and a tough bark.

There are only three genera in this order, *Aquilaria*, *Ophiospermum*, *Gyrinops*. Of the last two genera little is known. One species of each has been described.

There are three species of Aquilaria. *A. Malaccensis*, the *Bois d'Aigle*, or Eagle-wood, is a native of Malacca, and produces a whitish yellow wood. This is the *A. ovata* of some botanists. *A. Agallochum* is a native of the East Indies, where it is called *Ugoor*, or *Ugooroo*, by the natives, and *Lignum-aloes*, or Aloe-wood, by the Europeans. The wood has a fine scent, and is supposed to be the *Calambac*, or *Agallochum*, of the ancients. *A. secundaria* is another species which also yields a scented wood, and has been known in the Materia Medica, and used in perfumery, under the names of Agallochum, Lignum-aloes, and Aloe-wood. In a healthy state this wood is said to be white and inodorous; but it is subject to the attacks of disease, which causes the secretion of a resinous matter, and the wood then becomes coloured, and gives out a powerful scent. This secretion resembles camphor in many of its properties, and has a bitter flavour: hence the name of the tree. In medicine it is recommended in the same diseases as the fetid resins and volatile oils, but does not seem to possess peculiar properties; so that it is not used as a medicine in Europe. These trees must not be confounded with the *Aloexylon Agallochum*, or aloes-wood, which is a tree belonging to the natural order Leguminosæ, and which also yields a scented wood used by the Chinese in medicine and perfumery.

(Don, *Gardener's Dictionary;* Lindley, *Natural System;* Royle, *Illustrations.*)

AQUILE'GIA (literally the 'Watergatherer,' because the leaves collect water in their hollow) is a small genus of plants, commonly called *Columbines*, belonging to the crow-foot tribe, of which several species are cultivated in gardens.

AQUILEI'A, a town of the ancient Véneti, was made a Roman colony in B.C. 181; it was built near the western bank of the river Sontius, now Isonzo, in a low plain, watered by numerous rivers. It was a place of great trade, for, although several miles distant from the coast of the Adriatic, vessels could reach it through canals which communicated with the rivers Natissa and Anfora, which flow near it. The walls were twelve miles in extent, and the city was adorned with an amphitheatre and other splendid buildings. The Via Æmilia, a continuation of the Flaminian road from Rome, led through Ariminum and Bononia to Aquileia.

Aquileia was exposed to the first attacks of Alaric and the other barbarians who successively invaded Italy from the north-east. Attila stormed it, and, after an obstinate defence, pillaged and destroyed it by fire, after butchering the greater part of its inhabitants, A.D. 452. It was about this time that many fugitives from various towns destroyed by Attila escaped to the islets in the lagoons, where afterwards Venice was built. Aquileia was restored by Narses, the general of Justinian, but it never recovered its former splendour. The see of Aquileia was one of the oldest in Italy. Towards the end of the fourth century it was made a metropolitan see. In the sixth century a schism arose between the see of Aquileia and that of Rome, and metropolitans of Aquileia assumed the title of patriarchs, which was used in the Greek church. Charlemagne and his successors bestowed privileges on the see of Aquileia, which had already become reconciled with that of Rome, and had obtained from it the recognition of the patriarchal title. The wars between Frederic II. and the popes, and the factions of the Guelphs and Ghibelins, disturbed the country; and these, added to the unhealthiness of Aquileia, occasioned by the stagnant waters, induced the patriarchs, in the thirteenth century, to remove their residence to the castle of Udine, which town then rose on the decline of that of Aquileia. In 1420, the Venetians conquered Frioul, and Udine submitted to them. Thus ended the temporal dominion of the patriarchs. Their spiritual authority they retained until the year 1758, when the patriarchate was finally abolished, with the consent of the pope. Aquileia, or rather its remains, now forms part of the circle of Istria, in the government of Trieste. The road from Venice to Trieste passes through Palmanova, about eight miles north of Aquileia.

(Johannes Candidus, *Commentariorum Aquilejensium Libri VIII.;* De Rubeis, *Monumenta Ecclesiæ Aquilejensis.*)

AQUI'NAS, THOMAS, that is, *Thomas of Aquino*, in Naples, was a younger son of Landulf, count of Aquino, who was nephew of the Emperor Frederic I. He was born in 1227, some authorities state in the town of Aquino, others in the castle of Rocca Secca, the seat of his family, near the monastery of Monte Casino. When he was about thirteen he went to the university of Naples, which had been founded in 1230 by the Emperor Frederic II. From his earliest years he had shown a love of study; and when he was only in his fifteenth year he joined the order of preaching friars which had been founded by St. Dominic. His family carried him off to Rocca Secca, and in vain attempted to make him withdraw from the order, and at last the friars got the emperor and the pope, Innocent IV., to interfere, and by their command Aquinas was permitted to return to his convent. Soon after (in 1243) he made profession, and then went to Cologne to attend the theological and philosophical lectures delivered by Albertus Magnus in the Dominican convent there. His teacher detected the genius that was wrapped up under the taciturnity of the pupil. After remaining a few years at Cologne, he accompanied Albertus on a visit to Paris, from which they returned together in 1248. Aquinas was then ordained a priest. He returned to Paris in 1253, and published a treatise in defence of the monastic life. In 1255 Aquinas received from the University of Paris his degree of doctor in theology; and he afterwards spent several years in that city, where he lectured with immense applause. In 1272, however, he returned to Italy, and for two years taught theology at Naples. He died after a short illness in the Cistertian monastery of Fossi-Novi, in the diocese of Terracina, on the 7th of March, 1274, in the forty-eighth year of his age.

The most distinguished honours were paid to Thomas Aquinas, both during his life and after his death. The monks of the abbey in which he died, and the University of Paris, disputed the right to the possession of his body. On the 28th of January, 1369, his body was moved to the Do-

minican convent of Toulouse, where a magnificent tomb erected over it still remains. He had been canonized by Pope John XXII., by a bull dated the 18th of July, 1323. Pope Pius V. also declared him a doctor of the church in 1567. The piety and virtues of St. Thomas Aquinas have received the warmest commendations from his contemporaries. His religious sincerity and fervour appear to have been accompanied by unaffected humility, and by great mildness of temper. The best edition of his works is that printed at Rome, in 1570, in seventeen volumes folio. Various of his treatises have also been repeatedly printed separately. The most famous of his works is his 'Summa Theologiæ,' which is still a favourite authority in the Roman Catholic church. His 'Commentary on the Four Books of Peter Lombard' (called the Master of Sentences) was also long in high esteem. Many of the works that have been attributed to Aquinas are now admitted to be spurious; and doubts have even been entertained as to whether the 'Summa Theologiæ' be really his. He maintained the supreme and irresistible efficacy of divine grace, a doctrine which was afterwards opposed by Duns Scotus, and formed for ages a matter of violent controversy between the *Thomists* and the *Scotists*, as the followers of the two doctors called themselves. Some of the Latin hymns still used in the service of the Romish church are the composition of Aquinas.

AQUI'NO, an ancient but decayed town in the province of Campania or Terra di Lavóro, in the kingdom of Naples, stands 6 miles W. of San Germano, the ancient Casinum. It was a Roman colony, and a large and populous city in the time of Strabo: the Via Latina passed through it. Juvenal, the Roman satirist, was born at or in the neighbourhood of Aquinum. Pescennius Niger, one of the competitors for the empire after the death of Pertinax, was also a native of this place. Aquinum suffered greatly by the various invasions of the barbarians after the fall of the empire. At present Aquino contains hardly a thousand inhabitants; the ground is covered with ruins of buildings of various ages and styles, among which are the remains of a theatre and of an amphitheatre, and a lofty wall of square stones without cement, which formed part of a magnificent Doric temple.

AQUITA'NIA, one of the great divisions of ancient Gaul. The limits of Aquitania, as stated by Cæsar, were the river Garonne, the Pyrenees, and the ocean. The original Aquitanians are supposed to have been of Iberian race, and distinct from the Celts. The country was not subjugated until B.C. 28, when Augustus sent Marcus Valerius Messala to conquer it. In the division of Gaul into Roman provinces as settled by Augustus, the limits of Aquitania were extended northwards as far as the Loire, and eastwards to the Mount Cebenna (the Cevennes), which formed the limits of the Narbonensis province. In the subdivisions of Gaul under the later emperors, the Aquitania of Augustus was divided into three provinces. Under the reign of Honorius, the Visigoths took possession of Aquitania; which they kept till Clovis, king of the Franks, defeated them near Poitiers, A.D. 507, and killed their king, Alaric II. Aquitania then became part of the monarchy of the Franks; but under the successors of Clovis it was given as an apanage to Charibert, a younger son of Clotarius II. In 768 Pepin conquered Aquitania and reunited it to the French monarchy. But Aquitania had undergone another change in its southern limits. The Vascones, a Spanish people, being hard pressed by the Visigoths, crossed the Pyrenees and settled in the south part of Aquitania, which from them took the name of Vasconia or Gascony: the more northern parts of the same province continued to be called Aquitaine, and afterwards by corruption, Guienne. In the eleventh century Vascones became united to the duchy of Aquitaine, which, under the successors of Charlemagne, had become one of the great fiefs of the French monarchy, and virtually independent of the crown. Eleanor, the heiress of William, last Count of Poitou and Duke of Aquitaine, married Louis VII., king of France, but, being repudiated by him, she married Henry, duke of Normandy, afterwards Henry II. of England, who thus became possessed of Guienne, Poitou, Gascony, Anjou, in short of the whole of Aquitania in its most extended sense. This was the origin of long wars between the two kingdoms. Charles VII. conquered Guienne and the other districts above-mentioned, and took Bordeaux in 1451-2, and reunited the whole to France. The name of Guienne continued to be used as that of one of the provinces of the old monarchy, though restricted to a very small portion of the former Aquitania, until the French revolution.

ARA (the 'Altar'), a southern constellation, not visible in our latitude. It is situated near Lupus, above Pavo and Triangulum Australe, in such manner that the Centaur appears to be placing the Wolf upon the Altar. One mythological account explains it as the altar upon which Chiron sacrificed a wolf; another, as an altar constructed by Vulcan upon which the gods swore fidelity to each other during the war against the Titans.

ARA. (*Macrocercus*, Vieillot.) [MACAW.]

ARABESQUE. This name is intended to mean simply 'in the Arabian manner,' and is a French form of that expression. The mode of enrichment which it refers to was practised in the decoration of their structures by the Moors, Saracens, or Arabians of Spain. The most celebrated arabesques of modern times are those with which Raphael ornamented the piers and pilasters of the arcaded gallery of the palace of the Vatican which bears his name. The term Arabesque is more applied to painted than to sculptured ornament, though it is not restricted to the former.

ARABIA. This large country, the area of which is about four times that of France, resembles more a portion of the African than of the Asiatic continent; but it is included in Asia. Arabia presents the form of a vast peninsula, connected with the south-western extremity of the continent of Asia by an isthmus of sandy deserts, the breadth of which, from the northern end of the Gulf of Akabá to the mouth of the Shatt-el-Aráb (the Euphrates) in the Persian

Gulf, may be estimated at about 800 English miles. It is situated between 12° and 30° N. lat., and 32° and 59° E. long., partly within and partly to the north of the tropical region: the tropic of Cancer divides it into two nearly equal parts. It is bounded on the N. by Syria and the Euphrates, on the E. by the Persian Gulf; the Indian Ocean (called here the Arabian Sea and the Sea of 'Omán) washes the long extent of its south-eastern coast; the straits of Báb-el-Mándeb and the Red Sea form the western boundary. Cape Rasalgate or Rás-al-Hád is the most eastern projection of the peninsula; Cape Musendom (Cape Maketa of the ancients) extends in a north-easterly direction towards the straits of Ormus; Cape Aden, near the south-west angle of the peninsula, is discovered between 15 and 20 leagues off at sea, as a steep and lofty rock; Báb-el-Mándeb, or the 'Gate of Danger,' the dangerous passage from the Indian Sea into the Red Sea, is the point of the peninsula which is situated farthest to the south-west; and Cape Mohammed marks the projection of the Sinai mountains between the gulfs of Suez and Akabá, the two northern branches or gulfs of the Red Sea.

Physical Geography.—The whole peninsula of Arabia, as far as it is at present explored, consists of an elevated table-land, declining on the north towards the Syrian desert, and encircled along the sea-coast with a belt of flat sandy ground. The flat country, beginning at Suez and extending round the whole peninsula to the mouth of the Shatt-el-Aráb, is called Gaur or Tehámah, *i.e.* the 'Low-land,' from which the mountainous region in the interior is distinguished by the appellation of Jebel, 'the Hills,' or Nejd, the 'High-land.' The width of the Tehámah varies: near Mocha its breadth is about one day's journey, near Hodeida and Loheia about twice as much. On the eastern coast, in the province of 'Omán, from Rás-al-Hád up to Cape Musendom, it is much narrower: between the villages of Sib and Sohar indeed its width extends to about a day's journey; but in the remaining part of the country the hills reach almost to the sea.

The interior is separated into distinct portions by a singular arrangement of mountain chains. The low country is separated from the central plateau by four such chains, which form together a kind of oblong square or rectangle; and there are subordinate chains which stretch across from one to the other of the two longer sides of this rectangle. Some of these portions of the interior are almost wholly unknown to European geographers. It will be convenient to describe, first, the country adjacent to the four sides of the rectangle, and then so much of the interior as has been explored.

South-west District.—A range of mountains stretches from N.W. to S.E., nearly parallel to the coast of the Red Sea, and generally not far distant from it. Its northern commencement is the lofty peak of Mount Sinai. There is no general name for the entire range; but certain portions receive distinct names; such as Jebel-Asháb, Jebel-Tibús, &c. The prevalent rock of the whole chain is porphyry, rising with craggy serrated summits above a base of sandstone. The tract between the range and the sea is in many parts mountainous, being traversed by portions of the great range, and terminating abruptly towards the coast, from which it is separated in some places by narrow sandy tracts, while in others it forms bold promontories along the coast. In the latitude of Rás-el-hat-bah the range takes an eastern direction, and, afterwards running south, forms a bend round the high tract of Mecca, which is about 100 miles wide from west to east. This crescent-shaped bend, the Jebel-Kórá-Kharah, is the highest portion of the whole range; some of its peaks being from 15,000 to 18,000 feet above the sea level.

At about 19° 21′ N. lat. the range divides into two branches, one of which proceeds S. and the other S.S.E. They inclose between them a deep valley, through which a road is carried into the interior. The tract round Mecca is traversed by several offsets from the great range, which contain fertile valleys and plains between them, in one of which Mecca is situated. Jídda, the harbour of Mecca, has a good port, but the entrance is dangerous, on account of coral cliffs and shoals, which are common along the northern portion of the coast also, but are nowhere so numerous as on the coast south of Jídda. The coast near Jídda is low, bordered by sand-hills in the east, and it maintains this character for a great distance. Near the maritime town of Halí, the province of Hejáz ends, and that of Yemen commences; and eastward of the mountains in that latitude is the province of A'sír. Among the towns near the coast are San'á, on a plateau about 4000 feet high; Loheiá, Hodeiah, and Mocha. The mountains, in the Yemen province, have a rugged aspect. The Tehámah, or low land between them and the sea, has generally a fertile soil; and the valleys among the mountains are well cultivated. Cape Báb-el-Mándeb terminates this side of Arabia in 12° 40′ N. lat., 41° 12′ E. long. It is distant from the opposite coast of Abyssinia about 14 miles; and the intervening strait is divided into two by the small island of Perún.

South-east District.—The country extending along the coast from the Red Sea to the Persian Gulf is not much known. The mountains approach very near the sea; and northward of them, in the direction of San'á, is a sandy plateau traversed by ridges of hills, and intersected by wádís or fertile spots. Baron de Wrede, whose description of this country was published in the 'Journal' of the Geographical Society of London, in 1844, crossed several terraces and plateaus, rising higher and higher as they receded from the sea, and crowned at many parts by granitic rocks with craggy summits. He visited the desert El-Ahkaf, called Bahr-el-Saffi, one of the most extraordinary tracts on the surface of the globe. It is an immense sandy plain, about 1000 feet below the level of the high land (from which the Baron descended), and strewed with numberless undulating hills, without any trace of vegetation. There are many spots of dazzling whiteness, which contain deep chasms filled to the brim with powder-like sand. The traveller, having thrown a plummet of about one pound weight attached to a cord of sixty fa-

thoms into one of these sand-gulfs, which was about two miles long and nearly as broad, saw it sinking with diminishing velocity for about five minutes, when the end of the cord disappeared in the chasm.

North-east District.— The district just described, extending from Cape Báb-el-Mándeb to Rás-el-Hád, comprises the provinces or districts of Hadramáut and Shéher. The north-east district, extending along the western shore of the Persian Gulf, from Rás-al-Hád to the mouth of the Euphrates, comprises the province of 'Omán, and other provinces very little known. Rás-al-Hád is in 22° 23′ N. lat., 57° 32′ E. long. From that point the coast makes a concave bend to Rás-Héirán, near which is the town of Muscat; and another concave bend extends from Rás-Háirán to Cape or Rás-Musendom. The Straits of Ormus, between this cape and the coast of Persia, are about 32 miles wide at the narrowest part. The coast of 'Omán is generally low, being a narrow Tehámah backed by lofty chains of hills. Near Muscat rocks tower above the sea. 'Omán is generally a fertile, well-cultivated tract, though containing sandy districts.

At Rás-Musendom the coast suddenly turns south-west, and makes a deep bend to Rás-Anfir, the shores of which are generally flat, and lined with numerous islands and coral reefs. Another bend, northward of Rás-Anfir, forms the Gulf of Bahreín, in the middle of which lies the island of Bahreín, noted for pearl fisheries. From thence to the mouth of the Euphrates the shore presents a similar character, but has been little examined. There is a caravan route from El-Katif, on the Persian Gulf, through El-Derá'iyeh to Mecca. El-Derá'iyeh was the capital of the Wahabis, against whom an expedition was conducted by Ibrahim Pacha; it is, with the exception of Aneizeh, almost the only important town in the heart of Arabia.

Northern and Central Districts.—Near the town of Táyef (21° 20′ N. lat., 41° 15′ E. long.), about midway along the west coast of Arabia, commences a cross chain of mountains, the Jebel 'A'red, or Jebel 'Imaríyeh, which extends to the Persian Gulf. Northward of this, at about 28° N. lat., is another chain, nearly parallel to it, called Jebel Shammáh. The portion of country north of Jebel Shammáh comprises ancient Arabia Petræa, and the greater part of ancient Arabia Deserta: it is a sandy desert, with a few fertile spots, and is traversed by many caravan routes. The country between Jebel Shammáh and Jebel 'A'red is an elevated table-land, sloping towards the Persian Gulf. Southward of Jebel 'A'red the country is almost wholly unknown, but is supposed to be a table-land of a sandy character.

Climate and Productions.—The lowland or Tehámah of Arabia is occasionally, for many years, entirely destitute of rain; but sometimes it is scantily watered by the falling of slight showers during the months of March and April. The dews in the most arid tracts are said to be copious. The high-land has its regular rainy season, which begins about the middle of June, and continues till the end of September. Springs also abound in the loftier mountains, which, when fed by the copious annual rains, send streams of water through the valleys that descend towards the Tehámah: some of them are lost before they leave the mountainous region; others, which are more abundant, rush into the Tehámah, where the fertility of the soil mainly depends on irrigation. Most of the larger streams, as soon as they enter the burning plains, spread out into shallow lakes, and are lost in the sand; only a few reach the sea. These temporary currents of rain-water, and the small verdant valleys but a few feet below the general level which intersect the arid Tehámah, constitute an important and characteristic feature in the aspect of the country; they are called *wádís*, an expression which we frequently meet with, though variously written, as a component part of the names of rivers generally, on the maps of other countries also into which Arabian settlers have penetrated. The adopted Greek word *oasis*, or *auasis*, appears to be the same as *wádí*. Arabia is entirely destitute of navigable rivers.

In the Tehámah the heat during summer, owing to the want of rain and the almost direct action of a tropical sun, is intense. Niebuhr states, that during his residence in the low-land of Yemen, in the month of August, the thermometer rose to 98° Fahrenheit, and at Loheia, during the month of January, to 86°; at San'á, in the high-land, it only reached 85° during the summer; and Niebuhr heard it asserted, that in the latter district it sometimes freezes. At Muscat, the thermometer varies, according to Frazer, from 92° to 102° of Fahrenheit during summer.

The poisonous blasts known by the names of *sam*, *samum*, or *samiel*, seldom blow in the southern parts of Arabia. They are chiefly experienced in the tract between Basra, Bagdad, Haleb, and Mecca; but even here they are only dreaded during the hottest months of the year. These winds seem to derive their noxious qualities from passing over the great sandy desert when scorched by the intense rays of the tropical sun; and accordingly Niebuhr was informed that at Mecca the samum blows from the east, at Bagdad from the west, and at Basra from the north-west. The nature of winds generally seems to differ according to the tract which they have passed over. Ali Bey observes that, at Jidda, 'the north wind, traversing the deserts, arrives in such a state of dryness, that the skin is parched, paper cracks as if it were in the mouth of an oven, and the air is always loaded with sand. If the wind changes to the south, every thing is in the opposite extreme: the air is damp, every thing that you handle feels of a clammy wetness, and the atmosphere appears to be loaded with a sort of fog.'

Arabia has long been celebrated for the abundance of its odoriferous plants. The frankincense of Saba is alluded to by the prophets Isaiah and Jeremiah. Herodotus mentions frankincense, myrrh, cassia, cinnamon, and ladanum, as productions exclusively peculiar to Arabia; though his information on the products of Arabia is neither

extensive nor exact. Among the Romans, also, Arabian odours seem to have been quite proverbial.

The coffee-shrub is cultivated chiefly on the western descent of the chain of hills which, in the province of Yemen, separates the level country from the high-land: that grown at Bulgosa, near Beit-el-Fakih, and exported from Mocha, still maintains its superiority over the coffee produced in the European colonies in all other parts of the globe. The farinaceous deposit called manna, familiar to all readers from the use made of it by the Israelites during their wanderings in the desert, is now, according to Niebuhr, chiefly, if not exclusively, found on the leaves of a species of oak called *ballôt* or *afs:* according to others, it is a pellucid substance exuded by the leaves of different kinds of trees, chiefly the *hedysarum alhagi* of Linnæus. Grapes are cultivated in several parts of Arabia, though in the Koran wine is forbidden to the Mussulmans. In Yemen, where some pains are bestowed upon agriculture, Niebuhr saw excellent wheat, Turkey corn, or maize, durra, barley, beans, lentils, tobacco, &c.; senna and the cotton-tree are also cultivated here. Much indigo is grown about Zebid. Niebuhr says that he saw no oats in Arabia: the horses are fed on barley, and the asses on beans. The time of the harvest varies. At Muscat, wheat and barley are sown in December, and reaped in March; in the high-land, near San'á, the time of the harvest for barley is about the middle of July.

Arabia is rich in indigenous trees; the *acacia vera*, from which the gum-arabic is obtained, the date-tree, and many varieties of the palm and fig-tree, deserve to be particularly noticed. Forests appear to be rare. In the barren tracts of the country, the Beduins sometimes supply the deficiency of fuel by the dried dung of the camel.

Among the ancients, Arabia was celebrated for its wealth in precious metals; yet, according to the accounts of modern travellers, Arabia possesses at present no mines either of gold or silver. Iron mines are noticed by Niebuhr as existing in the territory of Saade. The lead mines of 'Omán are, according to him, very productive, and large quantities of lead are exported from Muscat.

On the sands of Arabia and Syria, the camel, the ship of the desert, as it is emphatically called by the natives, is an invaluable treasure. Like the Beduins themselves, it learns from early youth to endure hunger, thirst, and fatigue. It performs journeys of 300 to 400 hours without requiring to drink oftener than once in eight or ten days. The herbage scantily supplied by the desert is sufficient for its food. It carries a weight of a thousand pounds and upwards, without being unloaded for weeks. A hint from its leader directs its motions; a song renews its strength. Its hair is manufactured into cloth for garments and tents; its milk, like that of the cow, is nutritious and sweet; its flesh, when young, is in taste similar to veal.

Arabia is noted for its horses, of which there are two distinct breeds. The one, which is called *kadishi, i. e.* of unknown descent, is in no higher estimation than the common horses in Europe; horses of this breed are employed to carry loads, or as draught animals. The other, called *koheili*, or *kohlâni, i. e.* of ancient and noble pedigree, is reserved for riding only. The best horses are bred in the desert bordering on Syria: they are here educated in the encampments of the Beduins with a careful tenderness which trains them to habits of attachment to their masters. It is for this quality, and for their amazing speed, that they are valued, more than for their size or beauty.

There is also in Arabia a spirited kind of ass, which is used for riding and for military service; the best are to be found in the province of Lahsa. The Arabian oxen and cows are distinguished by a hump over the shoulders. Herodotus (iii. 113) mentions two kinds of sheep with fat tails as being indigenous in Arabia. The rock-goat, the fox, the musk-deer, and a wild species of ass, inhabit the hill-country. The jackal, the wolf, the hyæna, and the panther, roam around the tents of the Beduins, or follow the track of the caravans through the solitary desert. The gazelle seeks pasture and shade in the isolated *wádis*. The woods of Yemen and Aden are inhabited by troops of monkeys. The lion, from the frequent allusions to it in ancient Arabic poetry, and from the number of names which the language has for it, must at one period have been very common.

Among the birds indigenous in Arabia, we find mentioned several large birds of prey, such as the eagle, the vulture, and several kinds of hawk. The carrion-vulture frequents battle-fields and performs the services of scavenger. The ostrich and other birds valued for their plumage live in the deserts. Tame fowls, pheasants, and different sorts of pigeons, are frequent in Yemen. Along the coast of the Red Sea, pelicans and various kinds of sea-fowl are found.

The locusts of Arabia, whose devastations are so often alluded to, are dried, and roasted or boiled, and in this state eaten by the Arabs. Niebuhr states that they are strung on threads and offered for sale in the markets of all the Arabian towns from Báb-el-Mándeb to Basra.

The sea, on the eastern coast of 'Omán, is so abundant in fish, that not only asses, cows, and other domestic animals are fed with them, but they are also spread on the fields, to improve the soil, as manure. The pearl-fisheries of the Persian Gulf are universally celebrated. The bank on which pearl-shells are principally found extends from the Bahreín islands to very near the promontory of Julfar. The northern extremity, near the isles Karek and Bahreín, is distinguished as particularly rich in pearls.

Inhabitants and Political Divisions.—Arabia has been variously divided at different times; sometimes according to the inhabitants, sometimes according to the physical character of the different parts. Strabo divided it into two parts, the *Happy* and the *Desert Arabia*. Ptolemæus introduced the triple division of *Happy, Desert,* and *Stony Arabia*. In the time of the crusades the northern part of Arabia was divided into *Prima, Secunda,* and *Tertia,* by Christian annalists of those expeditions.

Niebuhr's divisions of Arabia are founded mainly on those of the Arabs themselves. They comprise Yemen, Hadramáut, 'Omán, Persian Gulf States, Lahsa, Nejd, Hejaz, and the Desert.

Yemen borders on the Red Sea, and on the territories of Hejaz, Nejd, and Hadramáut; it is divided into fourteen provinces, and contains the towns of San'á, Mocha, Loheia, Aden, and Hodeida. *Hadramáut* occupies the south-east part of Arabia, and is in part occupied by independent Beduin chiefs. *'Omán* is the dominion of one of the most powerful Arabian chiefs, the Imaum of Muscat, whose chief town is Rostak, and chief harbour Muscat. The *Persian Gulf States*, occupying the eastern shore of Arabia, are many in number, and are in the power of distinct tribes, who for the most part depend on navigation, fishery, and diving for pearls, for their livelihood. Dates, durra-bread, and fish, are their principal articles of food. Each little town has its own sheikh. In time of war, all their fishing-boats are made battle-ships; and as with a navy of this description decisive battles cannot easily take place, the internal contests between the little states continue almost without an interruption. When a Persian army is sent against them, they leave their settlements on the coast, where they have but little to lose, and retire in their boats to some uninhabited island till the troops are withdrawn. Among the islands off this coast are Kharej, Ormus, Kishme, and the Bahreín islands.

Lahsa, or *Hajar*, a district bordering 'Omán on the north, is inhabited inland by Beduins; the inhabitants along the coast subsist chiefly by the pearl-fishery, or the cultivation of date-trees. The principal towns are Lahsa, the residence of the sheikh, and Katif, a sea-port opposite the Bahreín islands, perhaps near the ancient Gerra. *Nejd* comprises much of the inland table-land, and is inhabited by Beduins. Besides the moveable tents of the nomadic Arabs, the traveller meets with a number of small villages, irregularly built, but populous, and agreeably situated on the declivities of hills, or in the midst of verdant valleys. The Nejd was the dominion of the Wahhabi reformer, against whom the Pacha of Egypt, Mehemet Ali, sent several expeditions between 1811 and 1838.

Hejaz borders on the east on Nejd, on the north on the Syrian desert and the Gulf of Akabá, on the west on the Red Sea, and on the south on Yemen. It is the holy land of the Mohammedans, on account of the two sacred cities Mecca and Medina, the former the native town of Mohammed, the latter the place where he is interred. It was for a long time under the dominion of the Sultan of Turkey, then under the Wahhabis, and now under the 'protectorship' of Mehemet Ali. Hejaz contains the towns of Mecca, with Jídda, its sea-port and citadel, Medina, Yaubo, Tayef, and Hali. Its chief importance is derived from the sacred character given by the Mohammedans to Mecca and Medina; to which towns pilgrimages are made annually from Turkey, Egypt, Persia, and other countries in which Mohammedans reside. The *Desert*, situated between Arabia and Syria, including the Arabia Petræa of the ancients, is now nearly desolate, and contains but few towns; the open country is entirely in the hands of the independent Beduins. At the northern extremity of the Gulf of Suez lies the town of Suez, one of the few safe and spacious harbours in the Red Sea, where ships can be repaired, and now an important place in respect to the overland route to India.

The Beduin Arabs, of whom mention is above made, are those nomadic tribes who dwell in tents, not in towns. The word *beduin* is a corruption of the Arabic *badwi*, which is derived from the substantive *badw*, 'an open country, a desert,' and signifies an inhabitant of the desert. The Arabs who live in towns, Niebuhr observes, especially those near the sea-coast, have through their commerce had so much intercourse with strangers, that they have lost much of their ancient manners and customs. But the true Arabs, who have always valued their freedom higher than wealth and luxury, live in detached tribes under tents, and still adhere to the primitive form of government, habits, and usages of their ancestors. Their nobles they call sheikhs. A sheikh rules over his family, and all its servants. If they are unable separately to defend their property against a hostile neighbour, several petty sheikhs unite, and choose a chief from among themselves. The Beduins are all, as it were, born soldiers, while at the same time they attend to their cattle. The sheikhs of the great tribes have a large number of camels, partly for use in time of war, partly to transport the goods of merchants from one town to another, and partly for sale. The smaller tribes, which are less wealthy and independent, principally tend sheep. Agriculture, and other descriptions of hard work, they commit to their subjects, the common Arabs, who live in miserable huts; the sheikhs live under tents. Being accustomed to an atmosphere of great purity, the scent of these Arabs of the desert is uncommonly nice. It is said that they are able to live for five days without drinking. The government remains in the family of every greater or smaller sheikh: among the sons or nearest relations, not the eldest, but he who appears the best fitted, is chosen. They pay little or nothing in the way of taxes to their superiors. Every little sheikh is not only the protector, but also the leader of his family; he is, accordingly, looked upon by the greater sheikh rather as a confederate than as a subject.

The Beduins have never been subjugated by foreign conquerors: only a few tribes who live near the large towns of Bagdad, Mosul, Orfa, Damascus, and Aleppo, are in some degree subject or tributary to the Grand Seignior. The several tribes are often at war with one another; but their conflicts are neither of long duration nor sanguinary. Whenever any tribe is attacked by a foreign enemy, all the neighbouring chiefs will unite in defence of the common cause. Every sheikh considers himself as sovereign in his territory, and therefore entitled to exact a tribute from travellers passing through it.

The sheikhs are daily mounted on horseback or on their dromedaries, to inspect their subjects, to visit friends, or to enjoy the pleasures of the

chase. The horizon in the desert is nearly as open as at sea. If a Beduin sees a solitary wanderer from afar, he rides towards him, and orders him to undress. In such cases, the Beduins are real robbers; yet it would be incorrect to say that they live chiefly from robbery. They seldom kill those whom they plunder, provided no resistance is offered; the robber is sometimes even kind and hospitable to the forlorn traveller whom he has plundered, furnishing him with provisions and old clothes in exchange for his own, and conducting him part of his way, that he may not perish in the desert.

The tents of the Beduins are made of a coarse kind of dark-coloured cloth, woven by their own women, which is drawn over seven or nine poles fixed upright in the ground, the middlemost being the highest. The larger tents consist of two or three compartments, so as to have separate rooms for the men and women, and for the domestic animals. The poor, who cannot afford the expense of a regular tent, spread a piece of cloth, as large as they can get, near a tree, or take shelter in the caves of rocks from heat or rain. There is but little furniture in a Beduin tent: a mat of straw is used as table, chairs, and bedstead; spare clothes are kept in bags. The kitchen apparatus is very simple and portable. The pots are made of copper lined with tin; the dishes of the same metals, or of wood. Their hearth is easily built; they merely place their caldrons on loose stones, or over a pit dug in the ground. They have neither spoons, nor knives and forks. A round piece of leather serves them as table-cloth, in which the remains of the meal are preserved. Their butter, which the heat soon melts down, they keep in leather bottles. Water is kept in goats' skins; a copper cup, carefully tinned over, serves as a drinking vessel. Wind-mills and water-mills are unknown; all grain is ground in a small hand-mill. There are no ovens in the desert: the dough is either kneaded into a flat cake, and baked on a round iron plate, or it is formed into large lumps, which are laid between glowing coals till they are sufficiently baked. Among the great sheikhs of the desert, who require nothing but pilau—*i. e.* boiled rice—for their meals, a large wooden dish full is served up, around which one party after another sits down, till the dish is emptied, or all are satisfied.

History.—The name of *Arabia*, by which the Greeks introduced this country to the knowledge of Europeans, is derived from the name which the Arabs have from a remote period applied to themselves; but the etymology of the word is not clearly settled. In the Bible, the terms Arabia and Arabs appear to apply only to small territories or isolated tribes in the northern part of what is now called Arabia.

The wandering tribes of Arabia seem to have been known from the earliest period of authentic history. The Midianites of Scripture occupied the northern part of Arabia; but these seem to have been rather Arabs of towns than Beduin Arabs; and indeed Arabia was celebrated for its commerce in Scriptural times, both for its own productions, and as an intermediate station in the trade with the East. Ophir, whence the ships of Solomon brought gold and other commodities, is believed by many writers to have been in Arabia. Antiquity abounds in proofs of the early trade of the Phœnicians with India, which must in a great measure have been carried on through Arabia. One of the earliest and most important allusions to this mercantile intercourse of the Phœnicians with several towns or countries and tribes of Arabia, occurs in the elegy of the prophet Ezekiel on the fall of Tyre. (Ezek. c. xxvii.)

The intrepid valour of the Arabs was proverbial among the Greeks and Romans. The body of the nation has escaped the dominion of the most powerful monarchies that have arisen and fallen in its immediate neighbourhood. Of the ancient Persian empire, Herodotus (iii. 88) expressly mentions, that all nations of (western) Asia were subject to Darius Hystaspis, except the Arabs, who were the independent confederates of the Persians; and when Cambyses had formed the design of invading Egypt, he was obliged to seek the friendship of some Arabs, who engaged to supply the Persian army with water during its march through the sands of Arabia Petræa.

Alexander the Great is said to have contemplated the circumnavigation of Arabia and the subjection of its predatory hordes. The fleet of Nearchus was preparing to make the circuit of the peninsula, when the death of Alexander prevented the execution of the design.

The Nabathæi ('Nebaïoth,' Gen. xxv. 13; xxviii. 9; Isa. lx. 7) inhabited, according to Diodorus (ii. 48), the north-eastern part of Arabia, which was subsequently, in allusion to the name of their capital Petra, called Arabia Petræa. Diodorus describes them as a valiant nation, safe in their deserts as in an asylum, where none but themselves knew the springs of water. Like other Beduin tribes, they subsisted in a great measure by predatory excursions: but they seem at an earlier age than their neighbours to have applied themselves to an independent traffic, and in consequence also to other occupations of peace. From the time of Alexander till that of Trajan, Arabia Petræa was subjected to many invasions; and it at length fell under the Roman power, in A.D. 107.

Of the internal history of Arabia before Mohammed, our knowledge is very imperfect. Prior to the beginning of the third century of the Christian æra, all that has been transmitted to us by Arabic writers amounts only to some genealogies or lists of kings, without any fixed chronology, and interspersed with but a few facts unsatisfactorily recorded.

The fountain Zemzem and the black stone in the ancient temple of Mecca, called the Caaba, had, from immemorial time, been regarded by the Arabs as national sanctuaries; and many of the Arabic annals and legends, prior to the time of Mohammed, relate to contests respecting the possession and protectorship of these sanctuaries; for this gave a kind of chieftainship over the other tribes. In A.D. 464, this guardianship was in the hands of the tribe of Koreish. About the close of

that century, many tribes of Arabia had embraced Judaism, while others had embraced Christianity; and contests between these various tribes did much towards paving the way for Mohammed's career.

The Arabs before Mohammed, like those of the present day, partly dwelt in cities, and partly as wandering tribes in movable encampments. The inhabitants of cities subsisted by agriculture and by different trades, especially by commerce, in which the tribe of Koreish appears early to have distinguished itself. The wandering Arabs employed themselves in the breeding and tending of cattle, and occasionally in the pillage of travellers. The picture exhibited by ancient poets (especially in the romance 'Antar' by Asmaï) of their customs and mode of life entirely corresponds to the representation which modern travellers make of the manners of the present Beduins.

With respect to the religion of the ancient Arabs, our information is very imperfect. As they were ranging their deserts beneath unclouded skies, they seem to have been early led to the worship of the heavenly luminaries. Various deities were also worshipped in the human and the brute forms. Among the tribe of Temim, on the Persian Gulf, the Persian fire-worship is said to have been introduced. The idea of goblins and fairies, some of a terrific, some of a mild and placid character, was early associated with the loneliness of the deserts. Fortune-telling, necromancy, astrology, and sorcery, were early at home in Arabia.

The Arabs, before the time of Mohammed, had never been united by a common tie into one mass; but that extraordinary man succeeded in forming them into a nation by giving them a common religion. Mohammed was born at Mecca, in A.D. 570; and at forty years of age he commenced that system of action which led to the foundation of Mohammedanism. Not only were the tribes of Arabia weakened by internal discord at that time, but the Byzantine and Persian empires were also at a low ebb, from various causes; so that every thing conspired to favour the rise of such a powerful and energetic man as Mohammed.

Mohammed founded a caliphat which in one century included Arabia, Syria, Mesopotamia, Egypt, Barbary, Persia, and Khorasan. At later periods, India and many parts of Asia, the remaining portions of North Africa, and Spain, were brought under the dominion of the caliphs. The seat of empire was several times removed; but Arabia still contained the two sacred cities to which the eyes of all Mohammedans were directed.

The caliphs of the *Ommaiade* family retained power from A.D. 670 till 749, the seat of empire being at Damascus. The caliphs of the Abbaside family reigned from 749 till 1528, with Bagdad as their capital. From the immense size of the empire thus formed, Arabia became only one and even a minor part of the whole. After the removal of the seat of government to Damascus and then to Bagdad, the country of Arabia relapsed into its former insignificance; it became a mere province of the Mohammedan empire, and was soon again divided into small domains. Except the monotonous enumeration of the annual procession of pilgrims to the sacred city, the mutual conflicts among the Beduin chiefs, and of late the rise of the Wahhabite power in the Nejd, the recent history of Arabia generally offers little of sufficient interest to fix the attention of the general historian.

After the conquest of Syria, Persia, Mauritania, and Spain, the trade of the Arabs became of great importance. The Islam favoured the establishment of emporia, and the wide dominion of one religion and one language rendered travels and mercantile transactions easy. The luxury of the court of Bagdad, and the magnificence of the Abbaside caliphat, caused frequent travels of merchants into India. After the ninth century of our æra, Arabs began to settle in various parts of India, and several Indian princes embraced the Mohammedan faith. The Arabs soon penetrated to the Indian islands, Ceylon, Sumatra, Java, Celebes, and even to China. Arabian caravans proceeded over land as far as Tartary and Siberia in the north; in Africa they came to the Niger, where, since the tenth century, the Mohammedan states of Ghana, Wangara, Tokrur, Kuku, and afterwards those of Sennaar, Dar-Fúr, Bornou, Tombuctu, and Melli, were founded. On the coasts of Africa they came through the Straits of Báb-el-Mándeb to Zanguebar, established the harbours of Makdashua, Melinde, Sofala, Kelu, and Mozambique, and went over to Madagascar.

(*Travels in Arabia*, by Niebuhr, Burckhardt, Jomard, Wellsted, &c.; *Geographical Mémoirs*, by Seetzen, Berghaus, and Hammer; *Notes*, by Wrede, in *Lond. Geog. Journ.* 1844.)

Arabian Language.—The Arabic forms, with the Ethiopic, the southern ramification of the great stock of languages commonly, though improperly, called the Semitic; the other two principal branches are, 1, the Aramaic branch, which comprises the Syriac and Chaldee languages; and 2, the Hebrew. Of the Hebrew, we possess the earliest written documents. About the time when it ceased to be a living language, the Chaldee makes its appearance. Whatever we possess in Syriac is of a still more recent date. The literature of the Arabic language does not reach far back beyond the age of Mohammed. At present most of these Semitic languages are extinct, or survive only in small districts. The Arabic alone has outlived all its sister-tongues, and has spread not only as the vernacular tongue all over Syria, Egypt, and Northern Africa, but also as the language of religion throughout Persia, the Turkish empire, and all countries into which the Mohammedan faith has been introduced.

Various dialects prevailed among the Arabian tribes previous to the age of Mohammed, among which that of the tribe of Koreish has through the Koran become the classical tongue. Niebuhr observes that the Arabic is at present spoken with the greatest purity in the district of Sahan. The Arabic language is rich, not only in words (especially in such as refer to natural objects and to the life of a nomadic people), but also in grammatical inflections, particularly in the verb, where

certain general modifications of the meaning are briefly and energetically expressed by slight changes in the form of the roots. After the first conquests of the Mohammedans, the correctness of the Arabic language seemed to become endangered through the frequent intercourse with strangers, and grammarians arose to fix its rules and secure it from corruption. Abu'l-Aswad al-Duli is mentioned as the first author on Arabic grammar: he lived under the caliph Ali ben Abi Taleb. Khalil ben Ahmed al-Ferahidi, of Basra, who lived during the second century of the Hegira, reduced the prosody and metrics of the Arabic poets into a system. Abu Nasr Ismael ben Hammad al-Jauhari (A.D. 1000, or, according to others, 1009) compiled a dictionary of the pure Arabic language, containing about 40,000 words, and entitled, 'Al-Sihah,' *i.e.* 'the Purity (of language);' this work is still of great value in oriental philology on account of the numerous quotations from ancient poems which are adduced in illustration. Al-Darir and Al-Sighani, two other lexicographers, flourished, the one in the eleventh and the other in the thirteenth century. In the fourteenth, Mohammed ben Yacub al-Firuzabadi (A.H. 817, A.D. 1414) compiled an immense Arabic thesaurus, entitled 'Al-Lami,' *i.e.* 'the Illuminator,' of which the author himself prepared an abridgment under the title of 'Al-Kamus,' or, 'the Ocean;' the latter work contains about 60,000 words, and is the best original Arabic dictionary that we possess; an accurate edition of it was published at Calcutta in 1817; a Turkish translation appeared at Scutari, in three volumes folio, 1815–1817.

It is not known when the art of writing was introduced into Arabia. Arabian authors speak of an alphabet used by the ancient Himyarides, which they call 'Al-Mosnad.' The northern Arabs do not appear to have had any alphabet till a short time before Mohammed: Morar ben Morrah is said to have introduced an alphabet which was founded on the Syriac Estrangelo character. In it the Koran was written, originally without diacritical points and vowels, which were, however, added before the end of the first century after the Hegira. This character, which was called the Cufic, in allusion to the copyists that lived at Cufa, remained long in use on coins and inscriptions: for common purposes a current handwriting, known under the name of 'Neskhi,' was introduced by Ebn Mokla, in the tenth century. This is the character still in use: the Persian *Taalik* and the African *Mogrebi* character are modifications of it.

To European students who wish to acquire a knowledge of the Arabic language the following works may be recommended:—Silvestre de Sacy's 'Grammaire Arabe,' 2nd edit., Paris, 1832, 2 vols. 8vo.; Ewald's 'Grammatica Critica Linguæ Arabicæ,' Leipzig, 1831-1833, 2 vols. 8vo.; Rosenmüller's 'Institutiones ad Fundamenta Linguæ Arabicæ,' Leipzig, 1818, 4to.; S. de Sacy's 'Chrestomathie Arabe,' 2nd edit., Paris, 1826-1830, 4 vols. 8vo.; Kosegarten's 'Chrestomathia Arabica,' Leipzig, 1828, 8vo.; Golius' 'Lexicon Arabico-Latinum,' Leyden, 1656, folio; Wilmet's 'Lexicon Linguæ Arabicæ in Coranum,' &c., Rotterdam, 1784, 4to.; Freytag's 'Lexicon Arabico-Latinum,' Halle, 1830, 4to.

The modern vernacular Arabic does not materially differ from the classical language of the Koran, which has become the model and standard of correctness for all Arabic writers; but in the grammatical forms time seems to have produced a change similar to that which we perceive in other languages, the history of which we can trace with accuracy. Among the grammars which have appeared of modern Arabic, that of Caussin de Perceval (Paris, 1823, 4to.) is considered the best.

Literature. — The Arabs do not possess any authentic literary relics anterior to the sixth century of our era, and the poems called 'Moallakat' all belong to that or the beginning of the next century. At the time when they were composed, the language and the poetry of the Arabs had already attained a high degree of cultivation.

As far as we are able to trace back the character of the Arabs, we find the love of poetry one of its essential features. We read of assemblies annually held at Okadh, in Yemen, where poets from all parts of Arabia contended for a prize by reciting their compositions: the poems of the successful competitors were, it is said, written in letters of gold and hung up on the Caaba, whence they were named *moallakat*, that is, 'the suspended.' Seven of these poems, those of Amru ben Kolthum, Amrulkeis, Antara, Tarafa, Lebid, Hareth, and Zohair, have been preserved.

Mohammed recommended learning and poetry, and the admired and often truly sublime diction of the Koran attests that he himself was no stranger to the powers of poetic language. Yet during the first century after his death, in the reign of the warlike Ommaiades, the voice of poetry was silenced in the noise of war. But literature flourished under the earlier Abbaside caliphs, and this is the period in which Asmai wrote the romance of 'Antar.' Of the well-known 'Arabian Nights,' which give so lively a representation of the state of society in Arabian towns, the period is still a matter of discussion.

Al-Mansur, the second of the Abbaside caliphs, was the first who distinguished himself by his zeal for literature, especially the study of the law, of astronomy, mathematics, and philosophy. The Christian physician, George Bakhtishu, seems to have first drawn the attention of the Arabs to Greek and Syriac literature. Harun al-Rashid called Gabriel the son of Bakhtishu to his court, who then lived at Nishabur; he caused many Greek and Syriac words to be translated into Arabic, and established colleges in the principal towns of the empire. In the reign of Mamun the literature of the Arabs saw its golden age. The works of Aristotle, of Hippocrates, Galen, Dioscorides, and Theophrastus, of Euclid, Archimedes, and Ptolemæus, were translated into Arabic, partly from the Greek originals, partly through intermediate Syriac versions. At the command of Mamun, Mohammed ben Musa, of Khowarezm, wrote the first elementary treatise on Algebra, evidently drawn in a great proportion from Indian sources. Mamun founded academies at Bagdad, Basra, Cufa, and Bokhara, and furnished scholars with

the necessary means to visit foreign countries for literary purposes. In his reign Yahya ben Abi'l-Mansur built and superintended observatories at Bagdad and Damascus.

In the subsequent times of the caliphat, the Emirs al Omara and the Bawaihide (Buide) sultans encouraged literature; in almost all the dynasties which sprung out of the caliphat, there were some sovereigns, at least, who loved the sciences and patronized scholars. The dynasty of the Fatimides in Egypt is in this respect distinguished. Ibrahim ben Aglab, the founder of the Aglabide dynasty, made Kairwan a seat of learning; and Zeiri encouraged literature in the town of Afshir, which he had founded in the territory of the present Algiers.

In Spain, the Ommaiade caliphs followed the example of Al-Mansur and his successors. An exchange of learned ambassadors took place between Abderrahman III. (912-961) and the German emperor, Otto I. His son Hakem founded the university of Cordova, and many colleges and libraries *in* Spain; his own library is said to have contained not less than 600,000 volumes. Gerbert of Aurillac, who afterwards ascended the papal throne as Sylvester II., studied at Cordova, and introduced into Europe the Arabic decimal system of numerical notation, for which the Arabs themselves were indebted to the Hindoos. Several English scholars, Adelard or Adhelard of Bath, in the eleventh, and Robert and Daniel Morley in the twelfth century, also visited the Arabic universities of Spain. It was through Spain, and through the Arabic versions, that the attention of the schoolmen was first drawn to the writings of Aristotle.

The literature of the Arabs is particularly important on account of its numerous and valuable historical works. A history of Arabic literature is still wanted. A good account of the works printed in Arabic till the year 1811 may be found in Schnurrer's 'Bibliotheca Arabica.' Those who want further information on the subject of Arabic literature must consult the 'Notices et Extraits des MSS. de la Bibliothèque du Roi,' the 'Bibliotheca Arabica Escurialensis' of Casiri, the 'Bibliotheca Orientalis' of Assemani, the 'Chrestomathie Arabe' and other works published by De Sacy, Mœller's 'Catalogue of the Arabic MSS. at Gotha,' Uri's and Nicoll's catalogues of the MSS. in the Bodleian library, the 'Mines de l'Orient,' and the 'Bibliothèque Orientale' of D'Herbelot.

ARABIAN GULF. [RED SEA.]

ARABIAN NIGHTS. [ARABIA—*Literature.*]

ARA'BII were, according to St. Augustin (Hæres. c. 83), a sect of Christians in Arabia, who believed the human soul to be mortal, and that it is dissolved by death together with the body, but will be restored to life at the resurrection. The Arabii were confuted by Origen, in a synod held in Arabia, A.D. 246 (Mansi, *Collectio Conciliorum*, t. i. p. 789).

ARABLE LAND, so called from the Latin word *arāre* 'to plough,' is that part of the land which is chiefly cultivated by means of the plough.

Land in general is divided into *arable land, grass land, wood land, common pasture,* and *waste.*

As, in the article SOIL, an account is given of the mineral ingredients found in vegetable soils, it will suffice here to say, that they consist of earthy metallic oxides, alkaline and saline substances, vegetable and animal matter, and water. Clay, or alumina, silica, or flint, in the form of sand, lime, and decaying vegetable matter or *humus,* are the principal among them.

The first approach towards a determination of the question—'Which soil is best fitted for a particular crop?' is made by analyzing existing fruitful soils, and this has been extensively practised since the application of chemistry to agriculture. The following are a few examples:—

A very rich soil near Drayton, Middlesex, examined by Davy, consisted of ⅔ of siliceous sand and ⅓ of impalpable powder, which, analyzed, was found to be composed of

	Parts.
Carbonate of lime	28
Siliceous earth	32
Alumina	29
Animal and vegetable matter	11
	100

This is a rich sandy loam, probably long and highly manured, fit for any kind of produce, and, if deep, admirably fitted for fruit-trees.

Another good turnip soil, by the same, consisted of 8 parts of coarse siliceous sand and 1 of fine earth, which, being analyzed, consisted of

	Parts.
Carbonate of lime	63
Silica	15
Alumina	11
Oxide of iron	3
Vegetable and saline matter	5
Water	3
	100

This is a very light sandy soil, and owes its fertility to the fine division of the carbonate of lime and the vegetable and saline matter. It may probably have been limed or marled at some time or other.

The best loam in France, according to Mr. Tillett, consists of

	Parts.
Fine siliceous sand	21
Coarse ditto	25
Carbonate of lime	37·5
Alumina	16·5
	100.

A loam at Chamart, highly prized by gardeners about Paris, as the basis of their artificial soils, consists of

	Parts.
Argillaceous sand	57
Finely divided clay	33
Siliceous sand	7·4
Carbonate of lime, coarse	1
Ditto, fine	·6
Woody fibre	·5
Humus and soluble matter	·5
	100

The argillaceous sand is composed of fragments of soft stone, which retain moisture, and do not bind hard; the small proportion of humus is of no consequence where manure is to be had in any quantity.

A very rich heath or bog-earth found at Meudon, and in great request for flowers and in composts, consists of

	Parts.
Gritty siliceous sand	62
Vegetable fibres partly decomposed	20
Humus	16
Carbonate of lime	·8
Soluble matter	1·2
	100

This soil, like our bog earth, would be very unfit for the growth of corn; but, from the quantity of humus and vegetable matter, is highly useful in composts and artificial soils; mixed with lime, it would make an excellent top-dressing for moist clay soils.

The German agriculturist Thaer has given a classification of soils of known qualities, worthy of notice. It is as follows:—

No.		Clay, p. cent.	Sand, p. cent.	Carb. of Lime, p. cent.	Humus, p. cent.	Value.
1	First class of strong wheat soils	74	10	4½	11½	100
2		81	6	4	8½	98
3		79	10	4	6½	96
4		40	20	36	4	90
5	Rich light sand in natural grass	14	49	10	27	?
6	Rich barley land	20	67	3	10	78
7	Good wheat land	58	36	2	4	77
8	Wheat land	56	30	12	2	75
9	Ditto.	60	38		2	70
10	Ditto.	48	50		2	65
11	Ditto.	69	30		2	60
12	Good barley land	38	60	Very insignificant quantities.	2	60
13	Ditto, second quality	33	65		2	50
14	Ditto.	28	70		2	40
15	Oat land	23½	75		1½	30
16	Ditto.	18½	80		1½	20

Below this are very poor rye-lands.

In all these soils the depth is supposed the same, and the quality uniform to the depth of at least six inches; the subsoil sound, and neither too wet nor too dry. The last column, of comparative value, is the result of several years' careful valuation of the returns, after labour and seed had been deducted.

Few soils in England contain more than 4 or 5 per cent. of humus, even when in very good heart; and 2 per cent., with a good loamy texture, will render a soil fit for corn with judicious cultivation.

The depth of the soil and the nature of the subsoil greatly affect its value. However rich it may be, if there is only a thin layer of good soil over a sharp gravel or a wet clay, it can never be very productive: in the first case, it will be parched in dry weather; and in the latter, converted into mud by every continued rain. If the subsoil be loam or chalk, six inches of good soil will be sufficient. With a foot of good soil, the subsoil is of little

consequence, provided it be dry, and the water can find a ready outlet. The best alluvial soils are generally deep, the chalky shallow.

The exposure, with respect to the sun, and the declivity of the ground, are very important circumstances, and equivalent to an actual difference in the climate. A gentle declivity towards the south, and a shelter against cold winds, may make as great a difference as several degrees of latitude; and in comparing the value of similar lands in different climates, the average heat and moisture in each must be accurately known. A soil very fertile in the south of Europe may be very unproductive in England; and a light soil of some value in the west of Scotland might be absolutely barren in Italy or Spain.

The better the soil, the less cultivation it requires to produce tolerable crops; hence, where the land is very rich, we find in general a slovenly culture; where the ground is less productive, more labour and skill are applied to compensate for the want of natural fertility. The simplest cultivation is that of the spade, the hoe, and the rake—and on a small scale it is the best; but spade husbandry cannot be carried to a great extent without employing more hands than can be spared from other occupations. The plough, drawn by oxen or horses, is the chief instrument of tillage, and has been so in all ages and nations of which we have any records. Its general form, and the mode of using, are explained under PLOUGH. The main object of ploughing is to turn over the whole surface of the ground, as a preparation for bringing it to a finely pulverized state, and to admit the atmosphere to act upon parts before excluded from it. When grass-land or stubble is ploughed, care must be taken to bury the grass and weeds completely, and the slice cut off by the plough must be turned over entirely, which is best done by making the width of the furrow greater than the depth. When the grass and weeds are rotten, and the ground is ploughed to pulverize it, a narrow deep furrow is best; the earth ploughed up is laid against the side of the preceding ridge, which forms a small furrow between the tops of the ridges, well adapted for the seed to lodge in and to be readily covered with the harrows.

Nothing has divided both practical and theoretical agriculturists more than the question whether the land should be ploughed deep or shallow; but a very slight attention to the purposes for which land is ploughed, and to the nature of the soil, will readily reconcile these apparently contradictory opinions. A deep, rich, and stiff soil can never be moved too much nor too deep: deep ploughing brings up rich earth, admits the air and water readily, and gives room for the roots to shoot, whilst the rich compact soil affords moisture and nourishment. Whenever the soil below a certain depth is of an inferior quality, there can be no use in bringing it up; and where the soil is light and porous, the bottom had much better not be broken. Norfolk farmers know this well, and are very careful not to break the *pan*, as they call it, in their light lands: this *pan* is formed by the pressure of the sole of the plough and the tread of the horses, and opposes a useful bank to the too rapid

filtration of the water; it lies from five to eight inches below the surface. If it is broken, the manure is washed down into the light subsoil, and the crop suffers, especially when sheep have been folded, their dung being very soluble. In such soils an artificial pan may be formed by the *land-presser* or *press-drill*. This instrument consists of two very heavy cast-iron wheels, with angular edges, set on an axle, at a distance from each other equal to the width of the furrows, and a lighter wheel to keep the instrument vertical. It is drawn by a horse immediately after the plough, pressing two furrows at once, and going twice over each furrow.

The mode in which the soil is prepared most perfectly for the reception of the seed is best shown by following the usual operations on fallows. After the harvest, the plough is set to work, and the stubble ploughed in. The winter's frost and snow mellow it, while the stubble and weeds rot below. In spring, as soon as the weather permits, it is ploughed again, the first ridges being turned over as they were before: this completes the decomposition of the roots and weeds. It is then stirred with harrows, or other instruments, which tear up the roots which remained, and some of these, not being easily destroyed, are carefully gathered and burnt, or put in a heap to ferment and rot, a portion of quick lime being added. Another ploughing and stirring follows, at some interval, till the whole ground is mellow, pulverized, and free from weeds; manure is put on, if required, and immediately spread and ploughed in; the land is then prepared for the seed.

Various instruments have been invented to stir the earth and mix it, without so often using the plough, and also to loosen and separate roots and weeds. These are described under HARROW; they all consist of series of spikes or teeth, which are made to break up the clods of earth. When the soil turned up by the plough is in large hard lumps, a roller, sometimes with spikes in it, is drawn over the land to break the clods, or mallets are used to break them by hand; but this is seldom necessary except where very stiff soils have been ploughed when too wet, and the ridges have dried and been ploughed again in dry weather.

The great expense of teams for the plough has led to expedients and inventions to lessen the labour; but, in general, a more imperfect cultivation has resulted from it. General Beatson, who had been in India, and had seen the simple instruments used there by the natives, substituted for the plough and cultivators in common use various light instruments, of which he published an account. He recommended stirring the soil only a few inches deep, except occasionally; and, by means of burnt clay, which he used in great abundance, he produced a succession of good crops: but he had too high an opinion of the fertilizing qualities of burnt clay, which made him undervalue animal and vegetable manure.

The influence of the atmosphere on the soil, and the increased fertility produced by pulverizing and stirring heavy lands, has led to the notion adopted by Jethro Tull, that labour might entirely supersede the necessity of manure: hence the origin of the horse-hoeing husbandry, which at one time was so highly thought of as to be called, by way of distinction, 'the new husbandry.' Fallows and manuring were both discarded as unnecessary; the seed was sown in rows with wide intervals, which were continually kept worked and stirred. At first the result was highly satisfactory; all the humus, by exposure to the air, was converted into soluble extract, and taken up by the plants, which throve well as long as the supply lasted: but in the end it was exhausted; and the system has gone out of favour.

In describing the various processes in general use in the cultivation of the soil, we have taken the year when the land is fallowed, because it is then that it receives the most perfect culture, which enables it to produce several crops afterwards with a much smaller quantity of labour. By such fallowing and proper manuring, the soil is fully restored to its highest degree of fertility. In light soils, which are generally poorer, turnips or other green crops are sown, on which sheep are folded, who, by their manure, still more enrich the soil, and it is only when this manure is ploughed in that the land may be considered as possessing the proper degree of fertility.

When the land has been duly prepared, the seed is sown. This is done sometimes before the last ploughing, but then the manure should have been ploughed in before; for, except in planting potatoes, which are not a seed but a bulb, the manure should always be deeper, and not in contact with the seed. When the seed is ploughed in, the furrow should not be above two or three inches deep, and eight or nine wide; and it is only in particular soils that this mode is to be recommended. The most common method is to sow the seed on the land after the last ploughing, and draw the harrows over to cover it: when the land has been well ploughed, and especially if the press-drill has followed the plough, the seed will mostly fall in the small furrows made by two adjoining ridges, and rise in regular rows. The various modes of sowing are described under DRILL and SOWING.

The proper season for sowing each kind of grain, the choice of seed, and other particulars, are explained under the name of the different seeds usually sown. As a general rule, it may be observed, that the smaller the seed, the less it must be covered, and clover or grass seed are not usually harrowed in, but only pressed in with the roller.

It has been found by experience, that besides the general exhaustion of humus produced by vegetation, especially by those plants which bear oily or farinaceous seeds, each kind of crop has a specific effect on the soil, so that no care, or manure, can make the same ground produce equal crops, of the same kind of grain, for any length of time without the intervention of other crops. Whether this be owing to any peculiar nourishment necessary to each particular kind of plants, or because plants not indigenous degenerate in a foreign soil, the fact is certain with respect to most crops usually raised, and particularly red clover. This points out the advantage of varying the crops, according as they are found to succeed best after each other. In general, all kinds of grain succeed

best after a crop which has been cut before the seed has ripened, or the stem is dried up. Those plants which have a naked stem with few leaves thrive best after leguminous plants, which have more succulent stems and more leaves, and which bear their seeds in pods, as peas, beans, tares or vetches; or after esculent roots, which strike deep into the ground, as carrots, parsnips, beet-roots, and turnips. From this circumstance, confirmed by universal experience, the different systems of *rotation* have had their origin, taking the nature of the soil into consideration. The various important circumstances which bear on this question are noticed under FALLOW, FARM, and ROTATION OF CROPS.

ARABS' GULF, a bay on the north coast of Africa, lying W. of the city of Alexandria. The bay called *Plinthinétes* (Herod. ii. 6) corresponded to or formed a part of the Arabs' Gulf.

ARACAN, or RAKHAIN, is a country of Asia, lying on the eastern shore of the Bay of Bengal. It extends from 20° 46′ to about 18° N. lat., and lies between 92° and 95° E. long. Its extreme length from N.N.W. to S.S.E. may amount to upwards of 230 miles, and its average breadth to about 50 miles.

It is bounded on the E. by a range of mountains, which separates it from the Burmese empire, from which it is also divided on the S. by a small mountain-river. On the W. it extends to the Bay of Bengal, and on the N. to Chittagong, a province of Bengal.

This country, which in 1826 was acquired by the East India Company from the Birmese, contains three districts, Aracan Proper, or Akyab, Sandoway, and Ramree.

Aracan Proper consists of a valley stretching nearly parallel to the shore, between a range of mountains and a ridge of hills. The mountain-range which divides it on the E. from Ava, is called Yeomadong by the Aracanese, and Anapectomiu by the Burmese: it extends from Cape Negrais (16° 2′ N. lat.) to the Tipperah Hills lying E. of Dacca in Bengal. Its mean elevation is about 3000 feet above the level of the sea; and several passes conduct over these mountains to Ava. The ridge of hills, on the other side of the valley, extends along the Bay of Bengal at no great distance from the shore. The hills are very irregular, and are intersected by many rivers and creeks. The coast is fronted by numerous islands, moderately high and thinly inhabited.

The valley varies in breadth: in some parts the hills advance from the shore so far to the east as to narrow it to 10 miles, and even less, whilst in other places they leave a space of 40 miles between them and the mountains. This valley is liable to be inundated by the sea; and it is watered by many small rivers, the chief of which are the Keladyne or Huritung, the Talak Keon, and the Yanaway Keon. The heat, the inundations, and the general moisture, combine to make this valley unhealthy.

The fertility of this country is very great, and its soil fit for the culture of nearly all tropical productions; but in the actual state of agriculture rice only is cultivated to any great extent. Indigo, cotton, and tobacco, as well as hemp, are also raised. Among other plants cultivated are the sesamum, mustard, sugar-cane, pepper, numerous fruits, and teak timber trees. The animals comprise tigers, wild elephants, buffaloes, poultry, and an abundance of fish. Salt and iron are among the mineral products.

Aracan, 20° 43′ N. lat., and 93° 31′ E. long., the ancient capital, is built on a plain entirely surrounded by hills, and intersected by several streamlets. One of these streamlets runs through the town and divides it into two parts connected by strong but clumsy wooden bridges. During the periodical rains the greater part of the town is inundated; and on this account here, as well as in the villages on the plain, the houses are raised upon piles or strong posts of timber, little more than four feet above the ground, that the water may have a free course under them. These houses, or rather huts, are miserable structures, only one story high, and thatched with straw or mats. This town is about four miles in circumference, and of a quadrangular form. Before its occupation by the British troops (in 1824) it is said to have contained 13,000 houses and 95,000 inhabitants. Within the town is a fort, surrounded by three quadrangular concentric walls, each about 20 feet high and of considerable thickness. There are also four pagodas, built in the centre of the town on a hill about 100 feet high, and inclosed by a quadrangular wall. Other pagodas are built in and around the town.

Akyab, the capital of the district which comprehends Aracan Proper, has a good harbour, but is little frequented, on account of its unhealthfulness. Two other towns are Talak and Aeng.

The district *Sandoway* comprehends chiefly the main land between 19° and 18° N. lat., and is a mountainous country, intersected by valleys running east and west. Not being exposed to inundations, nor subject to fogs, it is tolerably healthy, and enjoys a cool sea-breeze, with temperate nights, nearly throughout the year. The capital, Sandoway (18° 28′ N. lat., and 94° 27′ E. long.), lies on a navigable river, and is a thriving town.

The district *Ramree* contains the two large islands of *Ramree* and *Cheduba*, and several smaller ones. The Island of Ramree consists of hills, intermingled with much level ground, and has generally a very fertile soil. Kyouk Phyoo, the present capital of Aracan, is situated at the northern extremity of the island, on a beautiful plain, with much high land in its vicinity, which is covered with forest trees, yielding timber of superior quality. The Island of Cheduba is smaller and less important than Ramree.

The aborigines, who to all appearance form almost exclusively the population, are called *Mugs* by the inhabitants of Bengal, but their national name is *Yakain*, or *Ma-ran-ma*. They are short, squat, robust, and fleshy, and differ in features greatly from Europeans. Their face is somewhat of the shape of a lozengé, the forehead and chin being sharpened, but the face at the cheek-bones very broad. The eyebrows project very little, and the eyes are very narrow, and placed rather obliquely in the head, the external angles being

the highest. Their nose is very small, but has not, like that of the negro, the appearance of having been flattened; the hair is harsh, lank, and black.

Their language is one of those which may properly be called monosyllabic, from the mass of their radical words being monosyllables, like the spoken dialects of China. Their alphabet contains thirty-six letters. Most of the natives can read and write. Their religion is Buddhism, and their priests act as schoolmasters. Their moral character bears a favourable comparison with that of most Asiatics; for they are described as being truthful and inoffensive. The women dress much in the Chinese fashion; but they are not so much secluded as those of China.

The mountains which separate Aracan from the Birmese empire are inhabited by a nation called by the Birmese *Kyain*, but who term themselves *Koloon*, and whose language is peculiar, having little or no affinity to either Rakhain or Burma. They have preserved their independence, and seem to be an industrious race.

A considerable traffic was formerly carried on between Aracan and Ava; and since the occupation by the British new sources of trade have been opened.

This country is dependent on the presidency of Bengal. Each of the three districts, Akyab (Aracan), Sandoway, and Ramree, is governed by a civil judge or superintendent, under the immediate inspection of a commissioner, who usually resides at Chittagong. The revenue derived from it does not exceed three lacs of rupees and a half (360,000*l.*), produced principally by the rental of the land, the Company, as sovereign, considering themselves the proprietors of the soil.

(Symes's *Embassy to the Court of Ava*; Francis Buchanan, Dr. Leyden, Paton, and Trant, in the *Asiatic Researches*.)

A'RACHIS, in Botany, the generic name of a kind of pulse, called the Earth-Nut, which is much cultivated in the warmer parts of the world: it belongs to the pea tribe, to which and the bean it is botanically related. The seeds are considered a valuable article of food in Africa, and the tropical parts of Asia and America. In flavour they are as sweet as an almond; and they yield, when pressed, an oil in no respect inferior to that of olives. The plant will only grow in a light sandy soil, in which its pods can readily be buried, and it requires a climate as hot at least as that of the south of France. Its stems grow from one to two feet high; its leaves are composed of four broad and blunt leaflets; and its flowers are small and of a pale yellow colour.

ARA'CHNIDA (Spiders, Mites, Scorpions). The older entomologists placed the *Arachnida* within the pale of the *Insecta*; but they present such important differences as to justify their separation into a distinct class. 1st, they are utterly destitute of wings. 2nd, they never undergo metamorphoses, that is, a change through a larva and pupa state to a perfect condition, but only experience a succession of simple moults, said by M. Jarine, Fils, to be six in number, before attaining to their mature state. 3rd, the head is not separated from the thorax, but coalesces with it, there being only two great divisions of the whole body externally recognisable, instead of three. 4th, the eyes are simple, and the place of antennæ is taken by two small jointed pincers or claws (which have been erroneously deemed identical with the mandibles of insects), or, in spiders, by two points serving as lancets, called *antenne-pinces*, or antennæ-pincers; and *chelicières*, or maxillary palpi. 5th, the limbs are eight in number; but Messrs. Kirby and Spence regard the first pair, and perhaps correctly, as maxillary palpi.

Considered with respect to the nervous system, the *Arachnida* are far removed from insects; for, if the scorpions be excepted (which in consequence of the joints forming the tail have an extra number of ganglia), the number of the ganglia of the double nervous cord [ANIMAL] is at most three, and even in the scorpions it does not exceed seven.

The Arachnida are divided, according to the nature of their breathing apparatus, into two great orders or sections; viz. the *Trachearea*, or trachea-breathing Arachnida, and the *Pulmonaria*, or pulmonary Arachnida.

The *Trachearea* breathe by means of tubes or trachea, like insects, and appear to be the connecting link between that class and the Arachnida. This group includes several families. First, the mites, or *Acaridæ*, many of which are parasitic, and known as ticks (*Ixodes*). They infest animals of various kinds, and even insects. The dor-beetle is often covered with them. Some live on cheese, some on leaves, or beneath the bark of trees, and some (Hydrachna) are aquatic. All are minute. Secondly, the *Pycnogonidæ*, a singular group of marine animals of minute size found under stones, amongst sea-weed, or parasitic upon other animals. (See 'Mag. Zool. and Botan.,' vol. i. p. 376, pl. xiii.) Thirdly, the Shepherd spiders (*Phalangidæ*). And fourthly, the *Pseudoscorpionidæ*, or genus Galeodes, peculiar to the hot and sandy regions of the old world. One species, however, has been discovered by M. Poé near Havana. They resemble scorpions deprived of the tail; they run fast, defend themselves with courage, and their bite is very severe.

The *Pulmonaria* have the respiratory organs in the form of sacculi, opening externally by subabdominal orifices. This comparative perfection of the aerating apparatus indicates an accordant degree of perfection in the circulating system, which appears to consist of pulmonary, systemic, and returning vessels; but on this point little is very positively ascertained. The *Pulmonaria* includes the spiders, or *Araneidæ*, the *Phrynidæ*, or *Tarantulidæ*, as genera *Phrynus* and *Thelyphonus*, and the scorpions (*Scorpionidæ*).

The Arachnidæ are mostly carnivorous; some, as the spiders, are fierce and tiger-like in their habits, and instil a poison into the wound inflicted by their formidable maxillæ. The tail of the scorpion is armed with a sting, which like the poison fang of the serpent ejects poison into the wound it makes; in this animal the maxillary

palpi are developed into huge claws resembling those of the lobster; and used as organs of prehension. The scorpion is viviparous; but the spiders lay eggs, to the safety of which the female pays great attention. As weavers of tissues, adapted some for entangling insects, some for places of retreat and concealment, spiders have been celebrated from the earliest ages. All spiders, however, do not weave webs; some chase their prey, and some (as *Argyroneta*) are even aquatic, and live submerged in an air-filled diving-bell.

ARA'CHNIDA (Fossil) occur in the coal formation of Shropshire. (Prestwich.)

ARACK, or ARRAC, a distilled spirit prepared from different substances, more especially from sweet juice (toddy) extracted from the unexpanded flowers of different species of the palm tribe, In Ceylon, where a large quantity of arack is manufactured, it is entirely distilled from cocoa-nut tree toddy. The 'toddy topes,' or cocoa-nut tree orchards, are very extensive in Ceylon, and their produce is collected for the distillation of arack, and the manufacture of sugar and oil.

In Ceylon, when it is intended to draw toddy from a tope, the toddy-drawer selects a tree of easy ascent, and connects the upper branches of other trees to it, so as to pass readily from one to another. He ties the flowering spath in different places, and bruises it with the blow of a small mallet; this is done twice a day for a week; after which a portion of the spath is cut off, and juice slowly exudes from it. Successive portions of each spath, and successive trees in the tope, are treated in the same way. The juice or toddy is collected in gourds, from which it is emptied into vessels.

Arack may be distilled from toddy the same day it is drawn from the tree, but sometimes this operation is delayed until it becomes sour. The process of distillation is carried on in the maritime provinces in copper stills, but in the interior of the island earthen vessels are chiefly employed. Toddy yields by distillation about one-eighth part of proof-spirit.

On the peninsula of India, arack is distilled from the flowers of two or three different trees. In Java it is made from molasses, palm-wine, and rice. In Turkey it is made from the skins of grapes, flavoured with aniseed; the mountain Tartars distil it from many berries and fruits; and the Calmucks from milk.

Ceylon exports annually, and for the most part to the presidencies of Bengal, Madras, and Bombay, from 5000 to 6000 leaguers of arack, each containing 150 gallons. The prime cost of arack at Colombo in Ceylon varies from 8*d*. to 10*d*. per gallon. Ceylon arack is superior to Batavian arack, and it commonly brings a higher price of from 10 to 15 per cent. on the peninsula of India than Javanese manufactured spirits.

ARAD, Island. [BAHREIN.]

ARÆO'METER (from the Greek ἀραιός, 'light' or 'thin,' and μέτρον, 'a measure') is an instrument employed for the purpose of ascertaining the specific gravities of fluids, generally such as are less dense than water, but it is capable of being used also to determine those of any fluids, and also of solid bodies. Its theory is the same as that of the hydrometer [HYDROMETER], and its best form is probably that which was devised by Nicholson. The instrument which bears the name of that experimenter consists of a hollow cylinder, or sphere, of copper, from each extremity of which proceeds a stem; that which, when the instrument is in a vertical position, is uppermost, is a wire of hardened steel about 1-40th inch in diameter, carrying at its top a small cup in which weights may be placed: to the lower stem, which is short, is attached a stirrup carrying a cup in which may be placed a solid body whose specific gravity it may be required to determine. The instrument is so adjusted, that if a weight equal to 1000 grains be placed in the upper vessel, the whole will sink in distilled water at a temperature expressed by 60 degrees of Fahrenheit's thermometer, till a mark made on the stem is on a level with the fluid surface. When the specific gravity of a fluid, whether lighter or heavier than water, is to be determined, the instrument is plunged into the fluid, and weights are placed in the upper vessel till the mark on the stem is at the surface; then, if w in grains be the weight of the instrument when unloaded, and w' the weight placed in the vessel as just said: also if s be the specific gravity of distilled water, and s' that of the fluid in which the instrument is placed, we have, by hydrostatics,

$$w + 1000 : w + w' :: s : s';$$

whence s' may be found.

To obtain the specific gravity of a solid which does not imbibe water: after placing the instrument in distilled water let the body be laid in the upper vessel, and weights, in grains, added till the mark on the stem is at the level of the surface; these weights being subtracted from 1000 grains, leave the weight of the body in air: then, placing the body in the lower vessel, let other weights be added in the upper one till the mark on the stem is again at the surface of the water; these additional weights will express the loss which the body sustains by being immersed in water. Consequently if w'' be the weight of the body in air, w''' the loss just mentioned, s the specific gravity of the water, and s'' that of the body, we have by hydrostatics,

$$w''' : w'' :: s : s'';$$

whence s'' may be found.

If the substance whose specific gravity is required be, like wood, capable of imbibing water during the experiment, it should be left in the lower vessel, while under water, till the instrument is stationary, when the additional weights in the upper vessel will express the weight of th displaced water together with that which is imbibed; then, having dried the surface, let the substance be placed in the upper vessel and weighed in air as at first: the difference between this weight and that which was found before the substance was put in the water is the weight of the water imbibed; and this must of course be subtracted from the observed weight of the substance in water, previously to substituting the values of the terms in the last proportion.

For fluids of greater specific gravity than water, such as the concentrated acids, an instrument of the like kind which was invented by Guyton de Morveau, and is designated 'Gravimeter,' may be used. (Gregory's *Mechanics*, vol. ii.)

ARAFAT is the name of a hill near Mecca, where, according to the belief of the Mohammedans, Adam, conducted by the angel Gabriel, met Eve, after they had been separated for two hundred years, in consequence of their disobedience, and banishment from Paradise. It is the scene of an annual procession of the Mohammedans to the present day, at which certain prescribed ceremonies are performed, and no pilgrim, although he may have visited all the holy places of Mecca, is entitled to the name of *haji* unless he has been present on this occasion.

(Burckhardt's *Travels in Arabia*, London, 1829, 8vo, vol. ii. p. 40, &c.)

A'RAGON, or ARRAGON, one of the provinces of Spain, situated between 40° and 42° 55′ N. lat., 35′ E. and 1° 55′ W. long., is bounded on the E. by Catalonia and part of Valencia; by Navarre and Old Castile on the W.; on the S. by Valencia; and on the N. by the Pyrenees. It extends about 130 miles from E. to W., and 200 from N. to S. Aragon may be compared to a large basin surrounded on all sides by mountains. The Pyrenean chain and its ramifications separate it from France, the Sierras of Molina and Cuenca from Castile, and those of Morella from Valencia. The principal of these mountains is the great Pyrenean chain. The offsets of this range, which penetrate into Aragon, form a number of lateral valleys with a rapid slope to the south. The loftiest peak of the Pyrenean range situated in Aragon, is Monte Perdido, 11,168 feet above the sea level. The lateral valleys springing from the chain are those of Benasque, Bió, Broto, Fená, Caúfranc, Araques, Hecho, and Ausó. Every valley is separated from the adjoining by the gigantic offsets of the Pyrenees. All the summits in this part are covered with snow nine months in the year, and even in June it is found five or six feet deep.

Almost all the rivers of Aragon have their source either in the Pyrenees, or in a secondary chain called the Iberian; they flow in different directions to their common receptacle, the Ebro. This river crosses the province from N.W. to S.E. and divides it into two nearly equal parts. Several roads cross the province; and the Canal Imperial de Aragon extends from Tudela to Saragossa. The object of this canal is double, being designed both for irrigation and navigation.

The climate of Aragon varies according to the elevation and particular situation of the different districts, but in general, except on the mountainous parts, it is adapted to most of the productions of temperate climates.

The productions of the soil are, wheat, barley, rye, oats, Indian corn, leguminous vegetables, esparto, or Spanish broom, flax, hemp, sumach, barilla, madder, saffron, liquorice, fruits, oil, wine, and timber. The productions of the mineral kingdom are gold, silver, copper, iron, lead, quicksilver, cobalt, alum, jet, coals and copperas; few of these mines are now worked. Peat earth is found in the district of Teruel, and used for fuel. The mountains abound in game; wolves and bears are likewise found, and numerous herds of cattle feed in the valleys. Before the Peninsular war the number of sheep was 2,050,000 heads. The rivers produce exquisite fish, particularly trouts and eels; of the latter, the most celebrated are those of a lake, or rather pond, near Alcaniz. The produce of grain and wine is more than sufficient for the consumption; but there is a deficiency of horned cattle and mules, which are supplied from France. The industry of Aragon is very limited, and consists principally in manufactories of common cloth, hemp sandals, sacks, and cordage, hats, leather, paper, earthenware, and some iron foundries.

Aragon contains 1 archbishopric, 6 bishoprics, 8 collegiate churches, 1396 parishes, 23 hospitals, 2 universities, 12 cities, 239 villages, 688 hamlets. The population, according to the census of 1827, amounted to 856,219.

Of the 12 administrative districts, into which Spain was divided by the Royal Decree of Nov. 30, 1833, the ancient territories of the crown of Aragon contain 4, namely—Aragon, Catalonia (Cataluña), Valencia, and the Balearic Islands. Each of these is governed by an officer styled Captain-General, who also presides in the 'Audiencia Real' or supreme court of justice in his district. The 4 districts above named are subdivided into 13 provinces, namely—1, Saragossa, Huesca, Teruel, which form the government of the Captain-General of Aragon and are within the jurisdiction of the supreme court of Saragossa:—2, Barcelona, Tarragona, Lerida, Gerona, which form the government of Catalonia (Cataluña) and are subject to the supreme court of Barcelona:—3, Valencia, Alicante, *Castellon de la Plana*, *Murcia*, Albacete, which form the administrative district of Valencia and are within the jurisdiction of the supreme court of Valencia:—4, and the Balearic Islands, which form the government of the Captain-General of Majorca and are included in the jurisdiction of the supreme court of Palma.

In the early history of Aragon we find the province successively under the dominion of the Carthaginians, Romans, and Goths. When the Arabs invaded Spain, those Aragonese who escaped the sword of the invaders sought a refuge in the fastnesses of the Pyrenees, where they assembled together in the valley of Sobrarbe in Navarra, and chose for their leader Garcia Iñiguez, called also Iñigo Arista. Thus arose the kingdom of Aragon, having more of what would now be called a constitutional government than almost any other country in Europe. The kingdom was founded about A.D. 819. The king, the justicia or chief administrator of the laws, and the Cortes, or parliament, had their respective rights and duties exactly defined. The Cortes were composed of four orders, ecclesiastics, nobility, caballeros, and representatives of towns; each order decided on a measure separately, by majority; but all were required to consent to a law before it could become binding.

The Cortes were summoned by the king, and were also dissolved by him. On the opening of the assembly, a discourse was pronounced by the king, called the *proposicion;* and all the subsequent proceedings were remarkable for the liberal and popular tone which distinguished them. The *servicio,* or supplies, were granted by the Cortes, but not until the several petitions of the deputies had been first granted. In former times it was not called servicio, but *profierta* or *socorro,* offer or succour, and was made not in money, but in men; and the Aragonese resisted for a long time the introduction of money services to the crown. The kings borrowed money from the Cortes; and, by degrees, those loans assumed the shape of gifts or supplies.

The last sitting of the Cortes, in each session, was that called the *solio,* in which all the laws that had been enacted were solemnly proclaimed and sworn to, first by the king and the justicia, and then by two individuals for each order in the Cortes, and by all the public functionaries. The sanction of the king was absolutely requisite for the validity of any law; if he refused to give it, the deputies might insist, with all due respect, until the king signified that it was not his pleasure that it should be insisted upon any further. Though the king was present during the discussion, he was obliged to leave the Cortes when the vote was given.

Among the many privileges of the Aragonese, the most notable were, the *privilegio de la manifestacion,* and those of the *union.* By the privilege of the manifestacion, when any Aragonese was injured by any tribunal of the king contrary to the laws, he appeared before the justicia, and being asked by him whether he desired to be *manifestado,* if he answered in the affirmative, he was placed in the prison of the justicia, called the prison of the *manifestacion,* and his cause was taken from the judges of the crown, and examined by the court of the justicia. The privileges of the union were founded in 1288, and consisted in numerous checks to the ambition of such kings as might be disposed to overstep the bounds of their authority.

Under the kings of the Austrian dynasty, these institutions, which had lasted nearly eight centuries, began first to be undermined. The nobility of Aragon showed a disposition to cringe to the powerful monarch Philip II.; and during the latter half of the sixteenth century the constitution became little better than an empty sound; but it was not actually abolished until the eighteenth century, when Philip V., the first of the Bourbon dynasty in Spain, abolished it, not only in virtue of the sovereign authority residing in him, but by the right of conquest, as the decree states. In civil concerns, however, the Aragonese are still governed by their own laws, and only apply to those of Castile in cases where their fueros are deficient.

The crown in Aragon was elective; and although the king was generally chosen out of the family of the deceased monarch, many instances of a contrary kind are recorded.

Aragon was formerly the most powerful nation in the peninsula: it embraced the provinces of Navarra, Catalonia, and Valencia; abroad, it possessed the Balearic Islands and Sardinia. Ferdinand, the Catholic king of Aragon, was also king of the Two Sicilies, and by his marriage with Isabel of Castile the two kingdoms of Aragon and Castile were united under one sceptre.

The Aragonese are sullen and stern, scrupulously honest in keeping their word; brave, firm, and tenaciously opposed to all foreign dominion: the firmness of their character is proverbial, and often carried to excess.

A Chronological Table of the Kings of Aragon, from the separation of that Kingdom from Navarra to its union with Castile, showing the years of accession:—

A. D.	
1035.	Ramiro, son of Sancho el Mayor.
1063.	Sancho, son of Ramiro.
1094.	Pedro, son of Sancho.
1104.	Alonso, brother of Pedro.
1134.	Ramiro II., brother of Alonso.
1137.	Petronila, daughter of Ramiro II. Aragon and Catalonia were united by the marriage of this queen to Raimundo III., count of Barcelona.
1162.	Alonso II., son of Petronila.
1196.	Pedro II., son of Alonso II.
1213.	Jaime, son of Pedro II.
1276.	Pedro III., son of Jaime.
1285.	Alonso III., son of Pedro III.
1291.	Jaime II., brother of Alonso III.
1327.	Alonso IV., son of Jaime II.
1336.	Pedro IV., son of Alonso IV.
1387.	Juan, son of Pedro IV.
1395.	Martin, brother of Juan.
1412.	Fernando, brother of Enrique III., king of Castile, and nephew to Martin.
1416.	Alonso V., son of Fernando.
1458.	Juan II., brother of Alonso V.
1479.	Fernando II., son of Juan II., married Isabel of Castile, and thus Aragon and Castile were united under one sceptre in 1516.

(Zurita, *Anales de Aragon;* Blancas, *Rerum Aragonensium Commentarii, Modo de proceder en Cortes;* Martel, *Modo de celebrar Cortes, Fueros, y Observancias del Reino de Aragon;* Miñano; Antillon, *Geografia de España;* Antonio Perez, *Relacion;* Coxe's *Memoirs of the House of Bourbon.*)

ARAL, SEA OF, a great inland lake of Asia, situated E. of the Caspian Sea, between 43° and 47° N. lat., 58° and 62° E. long. Its greatest length is about 290 miles from N. to S.; its breadth from E. to W. is irregular, but it is nowhere less than 130 miles, and in some places 250. Its depth is not great, and it abounds so much in sand-banks near its shores, that the Kirghiz fishermen, its only navigators, are obliged to use flat-bottomed boats. The southern extremity is studded with innumerable small islands at the mouth of the river Amou.

The water is salt; a great diminution of its superficial extent has taken place within a very recent period, and seems to be in progress, and it would be interesting to know whether any cor-

responding increase takes place in the saltness of its waters. Two rivers of considerable magnitude discharge their waters into this lake; the Syr-daria or Sihoun, the ancient Iaxartes, flows into it from the E.; the Amou or Jhoin, the Oxus of the ancients, enters it from the S. The lake, like the Caspian, has no outlet; and the whole of the water supplied by these rivers, as well as that of some minor streams, must be carried off by evaporation. The supply of water is not equal to the waste by evaporation, so that the level of the lake is gradually lowering.

In the year 1811, the Russian travellers, Engelhardt and Parrot, found the surface of the Caspian to be 348·39 English feet lower than that of the Black Sea. The Aral is said to be 117 feet higher than the Caspian. But the levels of the Caspian and Black Sea are probably much nearer than is here stated.

On the N. of the Aral Lake is a wild hilly region, thinly inhabited by half-civilized nomadic tribes, who are to be found all round the lake, wherever an *oasis* in the desert enables man to subsist. The Monghodjar mountains, which occupy the highest part of these steppes, are a continuation of one of the groups into which the great Ural chain divides itself towards its southern termination. The hilly region gradually sinks to sandy plains towards the S. and E., no branch of the Urals being prolonged so as to reach any part of the Altai chain. These plains are composed of clay, marl, and calcareous tufa, covered by loose sand, which is blown up into hillocks from thirty to forty feet high, and the aspect of the country is thus changed after every storm of wind.

From the foot of the Monghodjar mountains to the banks of the Syr-daria, a distance of more than 270 miles, not a single river traverses the sandy desert, which is covered with a number of shallow salt-water lakes, and has exactly the appearance of land from which the sea has retreated. These lakes are in some places dried up, and have left a cake of salt of dazzling whiteness, covering a surface of sometimes six or seven square miles. From the north-eastern part of the Aral Lake to the mouth of the Syr-daria, there is a great sandy desert called Kara-Koum (meaning *black sand*), which is in some places 175 miles broad. The country along the banks of the Syr, and especially near its mouth, is tolerably fertile.

The country between the Aral Lake and the Caspian is but little known. The caravans between Astrakhan and Khiva, and between Orenbourg and Khiva, pass through it, the route to Orenbourg lying along the shore of the Aral Lake, and the distance between the two places being about 470 miles.

It has been supposed that the Aral Lake and the Caspian were at one time united; the Greek geographers appear to have been of this opinion, or rather were ignorant of the existence of the Aral Lake, for they make the Oxus and the Iaxartes flow into the eastern part of the Caspian. That this part of Asia has undergone great changes in its physical structure, and that the relative position of land and water has materially altered since the existence of the Caspian Sea, there can be no doubt. The surrounding districts do not support a great variety of animals and plants. Violent heats in summer, succeeded by very rigorous winters, are unfavourable to the growth of trees or even of shrubs. Poplars, willows, and tamarisks, are among the plants found there; rats, mice, marmots, hares, foxes, martens, and weasels, among the animals.

(Pallas's *Travels;* Pander's *Appendix to Meyendorff's Travels;* Engelhardt und Parrot, *Reise in den Kaukasus;* Meyendorff, *Voyage d'Orenbourg à Boukhara;* Humboldt, *Fragmens Asiatiques.*)

ARALIA'CEÆ are a small natural order of plants, nearly related to the umbelliferous tribe, from which they are solely known by their young fruit consisting of more parts than two. They are frequently shrubby, and not uncommonly furnished with powerful hard prickles; but they often are also herbaceous and unarmed, like umbelliferous plants themselves. As an illustration of the order, the American ginseng, *Panax quinquefolium*, may be taken. This plant, which is nearly related to the celebrated stimulating drug called *ginseng* by the Chinese, [PANAX,] is found occasionally on the mountains of America, from Canada to the Carolinas. It has long since been introduced into our gardens, but it is now seldom seen. This natural order seems to possess little or no sensible properties, for the singular invigorating power ascribed to ginseng by the Chinese is considered to be apocryphal.

ARAM, literally, the 'high land,' is a name given in the Old Testament to all the countries between Phœnicia, Palestine, Arabia, the Tigris, and Armenia, or to those countries which the Greeks called Syria and Mesopotamia (Jer. vii. 8; 1 Kings xx. 26). Aram was divided into 1, Aram of Damascus, the territory of Damascus, whose rulers waged almost continual war with the Hebrews from the time of David to the Babylonian exile (2 Sam. viii. 6; 1 Kings xi. 24 seq.; xvi. 5, &c.); and, 2, Aram-Zobah. Spanheim and Bochart think that Aram-Zobah means that part of the territory of Hamath where the town of Zobah was situated, not far from Tadmor or Palmyra (2 Chron. viii. 3, 4). The inhabitants of Aram-Zobah were frequently at war with the Hebrews. 3. Aram of the Two Rivers is the Mesopotamia of the Greeks, or the countries between the Euphrates and the Tigris (Gen. xxiv. 10; Deut. xxiii. 4; Judges iii. 8), which was also called Padan Aram, literally, 'the flat of the highland.' (Gen. xxv. 20; xxxi. 18.)

ARAM was, according to Moses of Choréne (i. 13, p. 83, ed. Whiston), a conqueror who went from the western or Aramæan or Syrian Cappadocia, or from Armenia Minor, into the highlands of Armenia, and from whom the present name of Armenia may be derived, like Anglia or England from the conquering colony of the Angles or Anglo-Saxons. This circumstance explains the fact, that the Aramæans and Armenians are sometimes confounded (as in Strabo, p. 41, 42, ed. Casaub.), and that the Armenians themselves do

not use the name of Armenia, which first occurs in Herodotus and other Greek authors, and has been since adopted by oriental writers.

ARAMÆAN or ARAMAIC LANGUAGE literally means the highland dialect, in contradistinction to the language of Canaan, or the lowland dialect. The Aramæan was thus denominated because those parts of Aram which bordered upon Palestine were higher than the territory of the Jews, and especially higher than the coast of the Mediterranean Sea, which was inhabited by the Canaanites. Thus a designation became current which was improperly applied to the whole of Aram, many parts of which had a lower level than Canaan. Aramaic is spoken near Mardin and Mosul (Niebuhr, 'Reisebeschreibung nach Arabien,' t. ii. p. 352). Niebuhr calls the Christian idiom Chaldee. The Christians of Mardin and Mosul write even the Arabic in Chaldee characters, and the Maronites in Syriac letters. W. G. Brown mentions in his Travels that the Syriac is spoken at Malala and Wara. Compare the 'Journal of a Residence at Bagdad,' by Anthony Groves, London, 1832, 8vo.

The Aramæan language comprises two principal dialects, the Babylonian or East-Aramaic (which is usually, but improperly, called Chaldee), and the Syriac or West-Aramaic dialects; both dialects, though nearly extinct, are yet spoken by a few tribes dwelling in the ancient Aram.

The sections in Daniel and Ezra called Chaldee, and a few words in Jeremiah and Genesis, are the most ancient remains of the East-Aramaic dialect, which is called by the Jews the language of the Talmud, or the language of learning, because parts of the Talmud, and many rabbinical writings, are composed in this idiom.

The oldest specimens of the West-Aramaic are much later; they consist of some Palmyrene inscriptions, one of which has been referred to A.D. 49. The characters of the West-Aramaic or Syriac differ greatly from the Hebrew.

The Aramæan language was spoken generally by the inhabitants of Palestine, from the Babylonian captivity to the general dispersion of the Jews. Jesus Christ, when repeating on the cross the beginning of the twenty-second Psalm, does not quote the Hebrew original, but the Aramaic version. Many other occasional quotations and expressions used in the New Testament and in the writings of Josephus indicate the prevalence of the Aramaic language in Palestine in the age of Christ. The Greek, however, had been long firmly established in Palestine, under the dynasty of the Seleucidæ. We know, both from positive testimony and the indirect evidence of inscriptions, &c., that Greek must have been common in Palestine at this period, though it was not the native tongue. Greek was also the language of science and learning, as it contained nearly all the knowledge which at that time existed. Concerning the language of Palestine in the age of Christ, compare the dissertations of De Rossi and Pfannkuche, and a chapter in Hug's Introduction to the New Testament; which have been translated, partly in America, by Robinson, in the 'Biblical Repository' for 1831, and partly in Edinburgh, in the 'Biblical Cabinet,' 1833, vol. i. The standard work on the Aramaic language is 'Andreæ Theophili Hofmanni Grammaticæ Syriacæ Libri Tres, cum Tabulis varia Scripturæ Aramaicæ Genera exhibentibus,' Halæ, 1827, 4to.

ARANDA, DON PEDRO PABLO ABARCA DE BOLEA, COUNT OF, descended from a very ancient and noble family in Aragon, was born about the year 1718, and embraced the profession of arms. In 1743 he was severely wounded in an engagement against the Austrians, near Bologna in Italy. Aranda was appointed ambassador to Frederic Augustus II., elector of Saxony and king of Poland. On his return to Spain, he was sent to Portugal in command of the Spanish army then invading Portugal. In August, 1762, he reduced Almeida and other places; and soon after peace was made. In 1765 Aranda was appointed captain-general of Valencia, and in the following year he was called to Madrid, that capital being then in a state of violent commotion against the minister Squillace. The conduct of Aranda in this emergency fully corresponded to the confidence placed in his talents. He was honoured with the presidency of the council of Castile. Not only was tranquillity restored in that capital, but by making a new municipal division of the city, by the establishment of a permanent garrison, and by other prudent regulations, the Count prevented the recurrence of similar riots. With a courage, firmness, and perseverance which no obstacle could daunt, he undertook the reform of abuses in every branch of the administration, and the adoption of those improvements of which his country stood so much in need. He diminished the asylums, confining their number to two churches in the capital of every province, and he reformed the municipal system by the establishment of the *diputados del commun*, or deputies of the commons. The coin, which was greatly debased, was called in and replaced by sound money; a new and improved plan was adopted for recruiting the army; the order of the Jesuits was abolished, and new houses of education established; and the thickets of the Sierra Morena, until then the abode of wolves and desperate banditti, were colonized with an industrious population of Germans, Swiss, and French, through the efforts of the philanthropic Olavide. Aranda also endeavoured to check the papal power in Spain. The power of the Inquisition was greatly diminished by the establishment of a political censorship, but this attempt, and an imprudent disclosure of his further intention to abolish it, raised such a ferment against him, that, foreseeing his ruin unavoidable, he solicited to be appointed ambassador to France, and retired from the administration in 1773. Aranda returned from Paris in November, 1787, but still remained in disgrace, with the honorary title of counsellor of state. After the accession of Charles IV. in 1788, Aranda superseded Count Florida Blanca in the office of prime minister (1792); but he was not long after dismissed through the intrigues of Godoy. He retained, however, the presidency of the council of Castile until he was exiled to his native province,

where he died, according to some authorities, in 1794, and according to others, which appear more to be depended on, in 1799, leaving behind him a young widow, without any children.

(Coxe's *Memoirs of the House of Bourbon*, vol. iv. ch. 67.)

ARANJUEZ ('Ara Jovis'), a town in Spain, in the province of Toledo, stands on the Tagus, in 40° 2′ N. lat., 3° 36′ W. long., 26 miles S.S.E. of Madrid. Aranjuez is the country residence of the court from Easter to the end of June, on account of its advantageous situation and the mildness of its climate. The palace is a handsome square building, with twenty-one windows in front, and a turret at each extremity. The gardens are particularly admired for their natural beauties; they are watered by the Tagus, which here forms a cascade with the whole width of its waters. The town is of modern construction; the streets are broad, very well paved, and intersect each other at right angles. The actual population of Aranjuez amounts to about 6000, which number is more than doubled during the residence of the court.

ARARAT, the name of a region in the centre of the highlands of Armenia. The mountains of this region are called the mountains of Ararat, on which the Ark rested (Gen. viii. 4). The whole of Armenia is called the kingdom of Ararat (Jer. li. 27). That Ararat was originally a name of the region appears from Moses of Choréne, 'Compendium Geographiæ Universalis,' pp. 46, 52.

ARARAT, MOUNT, a celebrated mountain of Armenia, situated to the S.W. of the town of Erivan, about 5 miles from the right bank of the river Aras, the ancient Araxes. It rises majestically from the midst of a great plain, detached from the other mountains of the country, in two conical peaks, one of which rises far above the limit of eternal snow. Humboldt, on the authority of the Russian traveller, Parrot, states its height above the level of the sea to be 2700 toises, which is equal to 17,260 English feet. The smaller cone is separated from the greater by a plain of great extent, and is considerably lower, for the snow disappears from its summit in summer. Such a mountain must naturally be seen from a vast distance, and it is said to serve as a landmark to the navigators of the Caspian Sea. A remarkable circumstance, as connected with the traditions belonging to this mountain, has been observed, namely, that when seen from afar and in certain positions, the summit has a striking resemblance to a ship. The whole country round is full of traditionary stories about Noah's ark and the flood. The higher regions are usually covered with clouds; and when these are dispersed, and the summit is unveiled, the devout Armenians fall on the ground, cross themselves, and pray. At Erivan, they show the spot where Noah first planted the vine, and the name of another town, Nachichevan, or Nakhdjovan, means, according to Chardin, 'place of descent,' being the place where Noah first settled when he came out of the ark.

Several attempts have been made to reach the top of the mountain; but few persons have reached beyond the snow limit. From all the accounts we have of its structure, there is little reason to doubt that Ararat is, partly at least, a volcanic mountain. Its conical shape and its detached position are in favour of this supposition. Tournefort, describing the ascent, says, that they passed over a great and beautiful plain to the base of the mountain; that at the beginning of the ascent they found moving sand, which continued for a great way up, their feet sinking in it so that they slipped back at each step, which made the ascent exceedingly laborious; that they afterwards came upon sharp fragments which cut their shoes to pieces, and then to large blocks piled upon one another. This description indicates a volcanic mountain covered with ashes and lava in a state of decomposition; and Colonel Monteith has more recently confirmed this view.

A remarkable circumstance is mentioned by Tournefort connected with Mount Ararat, namely, that the middle region, and even the borders of the snow limit, are inhabited by tigers. He says that he saw them within 700 yards of him, and that he and his people threw themselves on the ground for the sake of concealment while the tigers passed by. He adds that the young ones are caught in traps by the people round the mountain to be exhibited in shows of wild beasts throughout Persia.

(Tournefort, *Voyage dans le Levant;* Porter, *Travels*; Morier, *Travels;* Humboldt, *Fragmens Asiatiques.*)

ARAS, or ERAS, is a large river of Armenia, mentioned by Greek and Roman writers, under the name of Araxes. It rises at Dekman, in Mount Bin-Gheul, about 20 miles S.E. of Erzerum, and about 39° 47′ N. lat., 41° 9′ E. long. A branch of the North Frat or Euphrates rises on the opposite or western side of the same elevation, a fact known to Pliny (vi. 9). Its general course from this point is E., to within 8 or 10 miles of Erivan. From this point it takes a bend to the S.E. (passing the eastern base of Ararat) as far as the ruins of old Julfa, in the province of Nakhdjovan. Erivan and Nakhdjovan are now in the Russian province of Armenia, which was ceded by Persia, in 1828. From the ruins of Julfa the general course of the river is E. to the limits of Khaphan, where it turns N.E., running in this part of its course, with some considerable bends, through part of Nakhdjovan, Kaphan, and the Karabagh, to near Jevat, where it is joined by the Kur (Cyrus) coming from the Caucasus. The united stream, after running about 30 miles E., turns suddenly to the S., and enters the Caspian Lake by three mouths (about 39° 20′ N. lat.); a long projecting piece of land is here formed between the Caspian on the E., and the small gulf of Kizilgatch on the W. After its junction with the Kur, the river separates Great Armenia on the S. from Shirvan, and part of the ancient Albania on the N. Its length cannot be less than 600 or 700 miles, if its general course on our maps is correct.

The Araxes receives numerous tributaries, the Zenghi, one branch of which flows from the large lake Sevan, said to be about 5000 feet above

the sea, runs past Erivan, and joins the Araxes 24 miles from this town.

Many of the affluents of the Araxes rise in mountains covered with oaks, pines, and firs. The water of the river is pure and wholesome. It abounds in a great variety of excellent fish. It is much disputed, what river Herodotus (i. 202, iv. 40) means by the Araxes. The name Araxes was given to various rivers. An Araxes (now the Bund Emir) flowed through mountainous Persia, and entered the Lake of Bakhtegan. Xenophon, in his 'Anabasis,' gives the name of Araxes to the Aborras, or Chaborras, now the Khabour, an affluent of the Euphrates.

(*Journal Asiatique de Paris*, No. 71, 1833; *Journal of London Geographical Society*, vol. iii.)

ARA'TUS, son of Cleinias, was born at Sicyon 271 B.C. Cleinias was for a time tyrant, in the Greek sense, of Sicyon; but he was killed by Abantidas, who assumed his power, and suffering a like fate gave way to Páseas, who was succeeded by Nícocles. Aratus, who was seven years old at his father's death, was concealed for a time, and then conveyed to Argos. When Nícocles succeeded to the tyranny, Aratus was just entering upon manhood, and he became the object of the tyrant's fear. Aratus already meditated restoring himself to his native country; and he gained over to his views a few of the exiles who had been banished from Sicyon. When his plans were ripe, he made a night march from Argos to Sicyon, with a small number of followers, succeeded in scaling the walls, forced his way to the tyrant's residence, and mastered his guard. Nícocles made his escape, and a revolution was effected, B.C. 251, without the loss of a single life. Still the new order of things was far from being safely established. The exiles, who had returned to the number of about one hundred, sought to recover the possessions which they had formerly enjoyed. Aratus, seeing the danger of civil discord and the ambitious designs of Antigonus Gonatas, king of Macedonia, against all the Grecian cities, procured the enrolment of Sicyon as a member of the Achæan confederacy. [ACHÆAN CONFEDERATION.] Aratus had cultivated the friendship of Ptolemæus Euérgetes, king of Egypt, by sending presents of the most valuable productions of Grecian art; and he now undertook a voyage to Egypt, and got from the king a large sum of money, which Aratus employed, on his return to Greece, in satisfying the indigent exiles, and establishing concord.

Aratus was soon made captain-general (*stratégus*) of the Achæan league. He held this office for the first time B.C. 245. Being re-elected in 243, he conceived the project of wresting Corinth from Antigonus, the Acrocorinthus, or citadel of which, was considered the key of southern Greece. Aratus undertook the bold enterprise of mastering the strongest fortress of Greece, by night, with only 400 men; and he succeeded. He restored to the Corinthians the keys of the city, which, since the reign of Philip of Macedon, they had not had in keeping, and at his invitation Corinth joined the Achæan league. Mégaris, Trœzen, and Epidaurus, soon joined the confederation.

The powerful city of Argos had long been held by a succession of tyrants, but at last, in B.C. 227, Aristómachus, being tyrant for the time, was induced by Aratus to resign his power, and bring over Argos to the Achæan league.

Aratus made several unsuccessful attempts to drive the Macedonians from Athens. But soon after Antigonus, surnamed Doson, began to reign, B.C. 237, Diogenes, the Macedonian governor, delivered up the fortresses which he held, together with the isle of Sálamis, for a sum of money.

During about twenty years, in which the affairs of the Achæan league had been chiefly managed by Aratus, that body had become a powerful confederation, including the whole northern coast of Peloponnesus, with Corinth, Mégaris, and the greater part of Arcadia. This change was wrought, in a great measure, by the personal character of Aratus, who was elected general oftener, it should seem, than the law strictly allowed; for in a period of thirty years from his first elevation, B.C. 245, to his death, B.C. 213, he held the office seventeen times. Aratus was constantly opposed in his policy by the Macedonian kings, Antigonus and his son Demetrius, and frequently by the Ætolians, a warlike and turbulent people, who were given to plunder. In one of their predatory incursions into Peloponnesus, they were defeated by Aratus at Pelléne with considerable slaughter. Aratus gained reputation by his victory, for he in general was unsuccessful in the open field, and cautious to excess in his movements; and yet, as we have seen, he had attempted and succeeded in several desperate enterprises. His personal courage did not escape unquestioned; according to Polybius, qualities totally opposite were united in him, and in different circumstances he was no longer the same man.

Shortly after the accession of Argos to the Achæan league, war broke out (B.C. 226) between the Lacedæmonians under their king, Cleómenes, and the Achæans. Aristómachus, the late tyrant of Argos, was *strategus* when the war began. Cleómenes defeated Aratus (B.C. 225) at Mount Lyceum in Arcadia; but the Achæan general retrieved this mishap by gaining possession of Mantineia in his retreat. Soon after, another battle was won by Cleómenes under the walls of Megalópolis, and Aratus was loudly censured for his slackness and want of enterprise. Cleómenes continued his successful career: Argos, Phlius, Epidaurus, Trœzen, Hermione, went over to him; and Corinth passed into his hands, except the Acrocorinthus, which remained in custody of the Achæans. Aratus, though re-elected, had refused to accept the office of strategus; and he was blamed as the cause of all the misfortunes. Though ostensibly in a private station, he continued to exercise his usual influence. To extricate himself from the difficulties in which he was involved, he adopted the disgraceful expedient of inviting back the Macedonians into the Peloponnesus. The voluntary revolt of the Corinthians removed this difficulty, and the Achæans forthwith transferred the citadel to the custody of Antigonus. Cleómenes was obliged to abandon the Isthmus of Corinth in consequence of a counter-revolution at Argos, which returned to the Achæan alliance, and Antigonus

Doson entered Peloponnesus (B.C. 224). Antigonus took several Arcadian cities, and B.C. 222 defeated Cleómenes in the battle of Sellasia, which put an end to the war. The Macedonian king entered Sparta, but he contented himself with undoing the changes which Cleómenes had made. Cleómenes fled to Egypt, where he died. Antigonus died shortly after in Macedonia, and was succeeded by Philip, his nephew.

A series of provocations soon induced the Achæans to declare war against the turbulent Ætolians. Aratus, who was now strategus, hastened his march against the Ætolians, who were ravaging Messenia. He failed signally in the conduct of this campaign. Great complaints were made at the next congress; and Aratus, in defending himself, urged his former services as a ground for treating him leniently. He seems to have retained his wonted influence.

In the course of this war, Philip II., the young king of Macedonia, acted as general of the Macedonian and Achæan army. For some time he regulated his own conduct strictly after the counsels of Aratus; and he displayed such ability and justice, as gave rise to the fairest expectations. But some of the king's confidents contrived to destroy the influence of Aratus with Philip, who procured Epératus to be elected strategus in opposition to Aratus. Affairs went on ill in the hand of this incompetent man, and Philip was forced to seek a reconciliation with Aratus. The war was then prosecuted with success both in Ætolia and Peloponnesus. All parties, however, became desirous of peace. Philip sought to take advantage of the distress to which the Romans were reduced by Hannibal; both the Achæans and the Ætolians were glad to put an end to the struggle. Peace was concluded B.C. 217.

Philip's ambition was soon excited to reduce all Greece under his power, and the counsels of Aratus became distasteful to him. Latterly indeed Aratus had withdrawn entirely from his society, fearing to incur the odium of the crimes which he was constantly committing. To rid himself of all restraint (if Plutarch's tale be true, and it is confirmed by Polybius), the king procured the death of his old friend by a slow poison. (Polyb. viii. 14.) He died B.C. 213. He was buried at Sicyon, and a monument erected to him; and twice a year, on the anniversary of his birth, and of the restoration of liberty to the city, a religious festival was celebrated in his honour.

He wrote a history of his own times, entitled 'Commentaries' (ending with the year 220), which are lost. It has received high praise from Polybius, as containing 'very faithful and clear memorials of his own times;' and from the close of this work Polybius commenced his own history.

(Polybius, lib. ii. to ix. inclusive; Plutarch, *Lives* of *Aratus*, and *Cleómenes*.)

ARATUS, the author of an astronomical poem in Greek. He lived about the time of the first Punic war, and must be placed, as to the time of his notoriety, between Euclid and Apollonius of Perga. He was born in Cilicia, and studied medicine. It is stated that he was invited to Macedonia by Antigonus Gonatas, where he passed the rest of his days.

By the desire of Antigonus, Aratus turned the 'Phænomena' of Eudoxus into hexameter verse, and it appears from the commentary of Hipparchus, which is yet extant, that he made many alterations: for Hipparchus frequently cites the prose of Eudoxus and the poetry of Aratus together. Aratus is the second Greek writer on astronomy extant, Autólycus being the first. Aratus was probably neither an observer nor a mathematician, for, in his description of celestial phenomena, he uses no higher degree of precision than might have been attained by a mere spectator of the heavens.

The poem of Aratus is divided into two parts; the Φαινόμενα or 'Phænomena,' and the Διοσημεῖα or 'Prognostics;' the first part contains 732 lines, the second 417.

Aratus, in his poem, lays down the doctrine of the immovability of the earth and the motion of the heavens round a fixed axis. He describes the names and configurations of all the constellations then in use, their relative times of rising and setting, the march of the sun through the zodiac, and the milky way, which is described as one of the great circles of the heavens. The planets are simply mentioned as bodies having a motion of their own, but no idea is given of the length of periods. There is nothing on the orbit of the moon, or on the unequal motion of the sun in longitude. There are many mistakes as to the placing of the stars.

The 'Prognostics' consist of predictions of the weather from observation of astronomical phenomena: except that the celebrated cycle of 19 years is mentioned in it, it adds nothing to our knowledge of the existing state of astronomy. It contains various accounts of the effect of weather upon animals. There is not a word of astrology either in the 'Phænomena' or the 'Prognostics.'

There is an account of Aratus and his commentators in Delambre's 'Histoire de l' Astronomie Ancienne.'

The 'Phænomena' was translated into Latin by Cicero, and several fragments of it still exist. It was translated into Latin verse by Festus Aviénus, and also by Germanicus Cæsar, the father of the emperor Caligula. Germanicus also translated the 'Prognostics' into Latin verse: the remains of this version, and also the version of the 'Phænomena' by Germanicus, are printed in Orelli's edition of Phædrus, Zürich, 1831. The latest edition of Aratus is by Bekker, with *scholia*, Berlin, 1828, 8vo. J. H. Voss published a critical edition of the Greek text of Aratus, at Heidelberg, 1824, 8vo., with an excellent German poetical version.

ARAUCANIANS, the name given to a South American tribe inhabiting a country comprised between 36° 44′ and 39° 50′ S. lat., and 70° and 74° 30′ W. long., and bounded on the E. by the great Cordillera of the Andes, by the Pacific Ocean on the W., by the river Bio-bio on the N., and by the Valdivia or Callacalla on the S. It extends about 186 miles along the coast; the breadth from the sea to the crest of the Andes is perhaps about 150 miles. The people take the name of Araucanians from the province of Arauco, which is the smallest in the state.

The territory of Araucania has been divided

from time immemorial from N. to S. into four parallel *vuthanmapus* (otherwise written *uthal-mapus*), or tetrarchies, almost equal in extent, which are called *lauguen-mapu* or the maritime country, *lelvun-mapu* or plain country, *inapire-mapu* or country at the foot of the Andes, and *pire-mapu* or country of the Andes. Every *vuthan-mapu* is subdivided into five *illarehues* or provinces, and every *illarehue* into nine *rehues* or districts.

The political and social relations of the Araucanians are remarkable. The government is vested in an aristocracy of three orders, and is nereditary. The code of laws consists simply of traditionary customs. Fathers have unlimited power of punishment over their families. Many crimes are compounded for with money. The military government of the Araucanians, though not more complete than the civil and criminal codes, shows a considerable degree of intelligence. When the council has decided upon war, they proceed to choose a commander from among the four toquis, or chiefs of tetrarchies; but if none of them possess the necessary qualifications, an ulmen, or even any other inferior officer, is chosen. The general, having accepted the office, assumes the title of toqui, and takes the axe, which all the other toquis are obliged to lay down during the time of his dictatorship. The officers and soldiers are then chosen fairly from all the districts.

The Araucanian army consists of cavalry and infantry. The infantry is formed into regiments, each consisting of 1000 men divided into ten companies. The cavalry is divided in the same way, but the number of horsemen is not always the same. The soldiers wear no uniform; but they put on, under their usual dress, a cuirass made of leather hardened by means of a certain varnish. Their helmets and shields are also constructed of the same material. The cavalry are armed with lances and swords, and the infantry with pikes and clubs furnished with iron. Each soldier carries with him his own provisions, consisting of some roasted meal or flour in a bag, a small quantity of which mixed with cold or warm water serves them for food until they arrive at the enemy's territory.

The religious system of the Araucanians is in accordance with their political system of government. They acknowledge a Supreme Being, whom they call *Pillan*, a word derived from *pulli*, 'the soul,' which means the essential soul or spirit. The universal government of their *Pillan* is similar to their own. He is the great toqui of the universe, and has his apo-ulmenes and ulmenes to preside over the inferior affairs. The Araucanians suppose that the Supreme Being requires no sort of worship; accordingly, they have neither temples, idols, nor priests, and offer no sacrifices except on some solemn occasion, when they offer a llama, and burn tobacco, as the incense most grateful to their divinities. They are very superstitious: an Araucanian, who faces a cannon with intrepid valour, is terrified at the sight of an owl.

One of the chief articles of their religion is the immortality of the soul; and their funeral rites include ceremonies intended to prevent the soul of the deceased from coming back again to earth. They also preserve the tradition of a universal deluge from which a few persons were saved on the top of a mountain having three points, called by them the *Thegtheg*, or 'Thundering Mountain,' which floated upon the waters.

The Araucanians divide their years into seasons, months, and days, as we do. Their year is divided into twelve *cuyen*, or moons, of thirty days each, and five days are added, probably, to the last month. They divide the natural day into two equal parts, and these again they subdivide into parts, six for the day and six for the night; thus their *uagantu*, or hour, is equal to two of ours.

The only sciences which they cultivate are, oratory, poetry, and medicine. Oratory is highly prized by them. The poetry consists of laudations to the prowess of their heroes. The language, which is sedulously kept pure from foreign idioms, is said to be very copious. The only books existing in this language are catechisms, sermons, prayers, and other religious books, translated or composed by the Jesuits, to whose labours we are also indebted for most of the grammars and dictionaries of this tongue.

The physicians are of three classes—the *ampives*, or empirics, the *vileus*, or methodical, and the *machis*, who cure by spell. The modes of practice are sufficiently indicated by this classification. They have likewise two sorts of surgeons—the *gutarve*, who cures fractures, dislocations, ulcers, &c., and the *cupove*, or anatomizers, so called because they are principally employed in opening the bodies of such as die of unknown maladies.

The Araucanians have as many wives as they can support, or rather are able to purchase. The women are noted for the cleanliness of their houses, clothes, and persons. Their habitations are placed near the banks of rivers, in which, during summer, the men bathe several times a day, and in winter at least once a day. The moral education of the children is not more constrained than their physical. Their parents instruct the males in the management of arms, and in speaking their language with freedom, elegance, and purity, allowing them to do everything without restraint; they very seldom inflict on them any corporal punishment, as in their opinion this practice tends to degrade them and make them cowards.

The Araucanians are of a moderate stature, strong, muscular, and well-built, and naturally have a very martial air. Their colour, like the rest of the Americans, is that of copper, although somewhat lighter; their face is oval, their eyes small, but lively and full of expression, the nose rather flat, the mouth pleasing, with fine regular teeth; the legs well formed and muscular, with small and flat feet. They are bold, intrepid, courageous, constant in enduring the fatigues of war, and fearlessly expose their lives when the liberty of their country is at stake. They are also exceedingly jealous of their honour; hospit-

able, honest, grateful, generous, and humane to the enemies they have conquered; but they are indolent when not at war, addicted to intoxication, presumptuous, and haughty. Their dress is a sort of medium between the Spanish American and the American Indian.

Since the first invasion in 1537, the Araucanians have sustained an almost uninterrupted war against the Spaniards for nearly three hundred years. It was not until 1773 that Spain was forced to acknowledge the Araucanians as an independent nation, and to allow them to send an ambassador, who should reside at Santiago de Chili. In the late contest between the colonies and the mother country, the Araucanian toqui promised to observe a strict neutrality, and was faithful to his promise.

(Molina's *History of Chili;* Vancouver's *Voyages;* Schmidtmeyer's *Travels into Chili;* Febres, *Arte de la Lengua General del Reino de Chile.*)

ARAUCA'RIA, is the name of a singular genus of gigantic firs, found scattered over the southern hemisphere. It is known from all the other firs by its stiff broad leaves, by a long leafy appendage with which the scales of its cones are terminated, and by its anthers having many cells. Only three certain species have been described, of each of which we shall give some account.

Araucaria excelsa, commonly called the Norfolk Island Pine, is found not only in the spot after which it has been named, but also in several other places in the South Seas, as in New Caledonia, Botany Island, Isle of Pines, and in some parts of the east coast of New Holland. It is described as a most majestic tree, growing to the height of from 160 to 228 feet, with a circumference sometimes of more than 30 feet. Its trunk rises erect, and is sparingly covered with long, drooping, naked branches, towards the extremities of which the leaves are clustered; these latter, when the plant is young, are long, narrow, curved, sharp-pointed, and spreading, but when the tree is old they have a shorter and broader figure and are pressed close to the branches; old and young trees are consequently so different that one would think them distinct species. The bark abounds in turpentine; the wood, which is destitute of that substance, is white, tough, and close-grained. It was once expected that this tree would have been valuable for its timber, and that it would have afforded spars for the navy of great size; but it has been found on trial to be too heavy, and so unsound, that Captain Hunter could only find seven trees fit for use out of thirty-four that he caused to be felled. Its wood is, however, useful for carpenters' in-door work. Several specimens of this tree exist in the collections of this country. Unfortunately it will not live in the open air in the winter, and its growth is so rapid as to render it very soon too large for the loftiest greenhouses.

Araucaria Dombeyi, or *A. imbricata*, is a noble species, inhabiting the mountains of the Araucanian Indians in South America, whence the name of the genus derives its origin. Its wood is said to be durable, and it yields a great quantity of resin.

Araucaria Brasiliensis is extremely like the last, but the leaves are longer, weaker, and less densely imbricated; and it is much more impatient of cold. It is found wild in the southern provinces of Brazil.

ARAUCARITES (Presl), a genus of fossil plants found in the lias of Lyme Regis.

ARAVULLI, is a mountain-range of northern India, which extends in the direction of N.N.E. between 24° and 28° N. lat. 73° and 76° E. long. Its whole length may amount to 300 miles. Its breadth is various: from the southern extremity to the fortress of Komulmair it extends about 60 miles from W. to E., and is composed of numerous high ridges, generally running S.W. and N.E. To the north of Komulmair it forms one uninterrupted and compact range of table-land, from 6 to 20 miles in width. Thus it continues up to the town and valley of Ajmeer, where it begins to break into lofty ridges, sending out branches which terminate to the south of Kanoond and Rewaree. This mountain-chain does not rise to more than about 3000 feet above the level of the sea; but the extreme steepness of its declivity to the west renders it impossible for the boldest invader to attack India on this side. To the north it is skirted by the Indian desert, a country which rather resembles the high plains of Persia than the Sahara of Africa.

The southern extremity of the Aravulli range is united to the Vindhya mountains by an extremely hilly and broken country, extending from Edur to Lunawarra, on the river Myhie, occupying all the country on the upper part of that river and its branches, and joining the Vindhya mountains near Champanair. This range is composed of rocks of primitive formation, granite, quartz, compact dark-blue slate, gneiss, and syenite. Garnets, rock crystal, and some inferior kinds of emerald, are found.

ARAXES. [ARAS.]

ARBALEST or ARBLAST (Latin *arcubalista*, from *arcus*, 'a bow,' and *βάλλω*, to 'cast or shoot'), a cross-bow. This machine appears to have been derived from the larger *ballistæ*, and was probably introduced into England by the Normans, who used it with great effect at the battle of Hastings. The arrows used for the cross-bow were called *quarrels*, from the French *carreaux*, a term which indicates the square form of their heads. [ARCHERY.]

ARBE, an island in the Gulf of Quarnaro, in the circle of Zara in the Austrian province of Dalmatia. Its surface, which is very mountainous, has an area of about 29 square miles; it contains four valleys, which have a very productive soil. It produces wine, olives, figs, corn, and timber; these, together with its fishery, salt-pans, and numerous flocks, afford lucrative occupation to its inhabitants, who are about 3500 in number. The chief town is Arbe, which has a good harbour.

ARBE'LA, now Arbîl or Erbîl, a miserable village, which lies on the ordinary route from Bagdad to Mosul, in 36° 11′ N. latitude, according to Niebuhr's observations. It is situated between the Little and Great Zab (the Lycus), but nearer

the latter, in a hilly and tolerably fertile district. Part of the town, which consists of wretched houses built of sun-dried bricks, is on a hill, and part around it.

Arbela has given name to the last great battle between Alexander and Darius, B.C. 331. [ALEXANDER III., *of Macedonia.*]

(Niebuhr's *Travels*, vol. ii. p. 342, Copenhagen edition; Kinneir's *Memoirs of Persia.*)

ARBITRATION is the adjudication upon a matter in controversy between individuals by a person appointed by the parties. The person appointed to adjudicate is called an arbitrator, or referee. The matter on which he is appointed to adjudicate is said to be referred or submitted to arbitration. His judgment is called an award. The matters that can be referred to arbitration are such as may be the subject of an action at law or a suit in equity. An agreement to refer any differences which may hereafter arise is not in itself binding, for the parties cannot be compelled to name an arbitrator. But an agreement may be made to refer any dispute that may arise to arbitration, with a condition of certain penalties, to be paid by the party who shall refuse to agree in the appointment of an arbitrator. Any number of persons may be named as arbitrators: if the number is even, it is usually provided that, if they are divided in opinion, a third person shall be appointed, called an umpire, to whose sole decision the matter is then referred.

A dispute may be referred to arbitration, either —1, when there is an action or suit already pending between the parties relating thereto, or —2, when there is no such action or suit.

1. In the former case, the reference may be made at any stage of the proceedings: if before trial, it is effected by a rule of the court of law or an order of the court of equity in which the action or suit is brought; if at the trial, by an order of the judge or an order of Nisi Prius, either of which may afterwards be made a rule of court. The usual mode of proceeding in a case referred to arbitration, where an action is pending, is for the parties to consent that a verdict shall be given for the plaintiff for the damages laid in the declaration, subject to the award of the arbitrator.

The person named as arbitrator is not bound to accept the office, nor, having accepted, can he be compelled to proceed with it. If the arbitrator refuses or ceases to act, that reference is at an end, unless the contingency has been provided for.

The order of reference usually provides that the award shall be made within a certain period, and if the arbitrator lets the day pass without making his award his authority ceases; but a clause is usually inserted to enable the arbitrator to enlarge the time; and now the court, or any judge thereof, is, by a late statute (3 & 4 W. IV. c. 42), empowered to do so. The authority of an arbitrator ceases as soon as he has declared his award.

There were no means of compelling the attendance of witnesses, or the production of documents, before an arbitrator, until the 3 & 4 W. IV. c. 42, authorized the court or a judge to make an order to that effect. The witnesses are entitled to their expenses in the same manner as at a trial. The arbitrator can administer an oath or affirmation, as the case may be, if the order requires the witnesses to be examined on oath.

The extent of an arbitrator's authority depends entirely on the terms of the reference: it may either be confined to the action pending between the parties, or it may include any other specified grounds of dispute, or all disputes and controversies whatever existing between them at the time of the reference. Where the matters referred to him are specified, it is his duty to decide upon them all; where they are not specified, it is his duty to decide upon as many as are laid before him.

An arbitrator's decision is conclusive. But if his award be partially or improperly made, the superior courts have the power of setting it aside, upon application being made within a certain time. This happens either, 1, where the award is not co-extensive with the arbitrator's authority; or, 2, where it appears on the face of it to proceed on mistaken views of law, or to fail in some of the qualities required for its validity; or, 3, where any misconduct has been committed by the arbitrator.

When the award has been made and delivered, if one of the parties refuses to comply with it, the other may bring an action against him on the award. But the most efficient remedy is to apply to the court for an attachment, grounded on the contempt of court which he has been guilty of by disobeying the order of reference.

When, in the original action, a verdict has been given for the plaintiff subject to a reference, if the defendant does not perform the award, the plaintiff may, by leave of the court, enter a judgment and sue out execution for the whole damages mentioned in the verdict.

2. When no action has been commenced, the parties may refer their differences to arbitration by mutual agreement.

Whether the submission to arbitration be verbal or in writing, it is in the power of either of the parties to revoke it at any time before the award is made. In order to prevent this, it is usual for the parties to make it a part of their agreement, that they will abide by and perform the award; and if after this either of them should, without sufficient reason, revoke his submission, or otherwise prevent the arbitrator from proceeding with the arbitration, he will be liable to an action for the breach of his agreement.

There are no means of compelling the attendance of witnesses, nor has the arbitrator the power of administering an oath; but the witnesses and—if they have agreed to be examined—the parties are sworn either before a judge, or, in the country, before a commissioner. They may, however, be examined without having been sworn, if no objection is made to it at the time.

The courts cannot enforce performance of the award by attachment; the only remedy is an action on the award itself, or rather, on the agreement of submission.

But the statute 9 & 10 W. III. c. 15, enables parties to put references by agreement on

the same footing as those which are made where a cause is depending; and this is effected by making the submission to arbitration a rule of any of the king's courts of record. The provisions of the 3 & 4 W. IV. c. 42, apply to arbitrations made in pursuance of such agreements of submission, and to those made by order of court.

Previously to the 3 & 4 Will. IV. c. 42, the authority of the arbitrator was revocable by either party at any time before the award was made; but by that statute it is declared that the authority of an arbitrator cannot be revoked by any of the parties, without the leave of the court or a judge. It is still determined by the death of any of the parties, unless a clause to obviate this is inserted in the submission; and, if one of the parties is a single woman, her marriage will have the same effect.

The only mode of referring a matter to arbitration in the Roman law was by an agreement called *compromissum*, which contained the names of the arbitrators (hence called *arbitri compromissarii*), the matters intended to be referred, and an undertaking by both parties to abide by the award, or in default thereof to pay to the other a certain sum of money as a penalty. The rule which forbids matters of public interest to be submitted to the judgment of a private referee, was not confined to criminal prosecutions and penal actions, but extended to preclude arbitrators as well from entertaining any question affecting the civil condition (*status*) of any individual,—his freedom, for instance,—as from deciding on the validity of any contract which it was attempted to set aside on the ground of its having been obtained by fraud or force. The general rules applicable to arbitration among the Romans ('Dig.' 4, tit. 8) have been the foundation of the system in modern Europe.

The Roman law was, with some slight modifications, adopted in France (Domat, 'Civil Law,' part i. book i. tit. 14; and 'Public Law,' book ii. tit. 7; Pothier, 'Traité de Procédure Civile,' part ii. chap. iv. art. 2), and, notwithstanding the changes which have been introduced from time to time, it still forms the groundwork of the system.

ARBITRATION. In Scotland the system of arbitration is a modification of that of the Roman law. The submission, by which the parties agree to abide by the decision of an arbiter, is a regularly executed contract, and it requires all the solemnities peculiar to the execution of deeds in Scotland. According to the practice by which, on the consent of the parties to that effect embodied in its substance, a contract may be registered for execution, the submission may contain a clause authorizing the decree to be pronounced on it to be registered for execution; and, when so registered, the arbiter's decision is in the same position as the decree of a court. It was formerly usual to embody a clause of registration for execution against the arbiter if he failed to give a decision. This practice is now disused, but it is still held, according to the doctrine of the civilians, that an arbiter who has accepted the submission can be judicially compelled to decide. Where there were two arbiters, and action was raised against one of them, either to concur with the other or name an oversman (umpire), 'the court, without entering on the question how far a sole arbiter is bound to decide, were clear that against one of two arbiters the conclusions of the action were ill-founded.' (*White* v. *Fergus*, 7th July, 1796, M. 633.) The decree arbitral must be executed with the usual solemnities of written deeds in Scotland. A submission in which the arbiters are not named is not binding on the parties. If there be more than one arbiter, the decree is not valid unless they be unanimous. An oversman may be named in the submission, or the arbiters may be empowered to choose one. It is a condition precedent to any reference to an oversman, that the arbiters are not unanimous, and the proceedings of an oversman are null if there is no difference of opinion. The oversman's decree must bear that the arbiters differed in opinion. A time during which the submission is to be in force may be fixed with or without a power of prorogation. It has become a practice that, when a blank space is left in the submission for the period of its continuance, that period is held to be a year. Where there is no such blank, it is presumed that the submission subsists for the period of what is called 'the long prescription,' viz. 40 years.

ARBLAST. [ARBALEST.]

ARBOGAST, LOUIS FREDERIC ANTOINE, was born at Mutzig in Alsace, in 1759. According to the account given in the 'Biographie Universelle,' he was successively professor of mathematics at the school of artillery at Strassburg, and rector of the university of the same town. He afterwards represented the department of the Lower Rhine in the national convention, where, however, he took no prominent part in politics, and his name only appears to some reports on scientific subjects. He was also a principal actor in the formation of the committee of public instruction, to the affairs of which he particularly devoted himself. After the dissolution of the convention, he became professor of mathematics in the central school of his department at Strasburg, where he died April 8, 1803, leaving a name which must be placed high among those of the analysts of his day, and a character without reproach.

Arbogast will always be known to mathematicians as the author of the celebrated *method of derivations*, which we cannot describe here.

ARBOIS. [JURA.]

ARBROATH. [ABERBROTHWICK.]

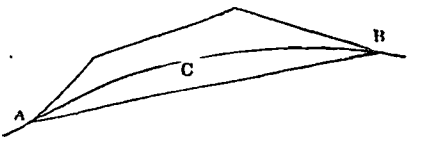
ARBUTHNOT, JOHN, the son of a clergyman, of the Scotch Episcopal Church, was educated in the University of Aberdeen, where he took his doctor's degree in medicine, and subsequently came to London in pursuit of fortune. He began by teaching mathematics as a means of subsistence, but soon attracted notice as a scientific writer. His extensive learning and conversational talents introduced him gradually into practice, and he became eminent in his profession. Arbuthnot was appointed physician in ordinary to Queen Anne in 1709, and admitted a fellow of the College of Physicians. He had for some years before been a fellow of the Royal Society. His talents, learning, and fascinating manners, introduced him to an intimate correspondence and

friendship with Pope, Swift, Gay, Parnell, and other leading wits of the period, who were all associated as members of the Scriblerus Club. In 1714 he engaged with Swift and Pope in a design to write a satire on the abuse of human learning in every branch. But the project was stopped, when nothing more than an imperfect essay towards it had been drawn out, under the title of the first book of the 'Memoirs of Martinus Scriblerus.' It is characterized by a brilliancy and exuberance, not to say extravagance, of wit and humour, which is pretty sure to tempt any who has once read it to a second perusal. 'Gulliver's Travels' are said by Warburton to have been first intended as a part of these memoirs. The treatise, 'Of the Art of Sinking in Poetry,' the 'Virgilius Restauratus,' and the report 'Stradling *v.* Stiles,' are detached portions of the same work. The humorous political pamphlet of 'John Bull,' which has served as the model for many *jeux-d'esprit* upon the same plan, is generally believed to have been written by Arbuthnot. The queen's death, and the consequent disasters which befell his friends, deeply affected Arbuthnot's spirits. He lost his place and official residence at St. James's; but he continued the practice of medicine with success, and amused his intervals of leisure in writing papers of wit and humour. In 1734 he retired to Hampstead, in hope of some relief from his complaint of asthma; but died at his house in Cork Street, Burlington Gardens, in February, 1735. He was married, and had four children.

ARBUTUS, a genus of evergreen shrubs, belonging to the natural order *Ericaceæ*. It is characterised by its fruit being a berry, containing many seeds. The most remarkable species is the arbutus of Virgil, now called *A. unedo*, or the strawberry tree, from the resemblance borne by its berries to that well-known fruit. It is a native of the south of Europe and the Levant; in our gardens it proves a hardy evergreen tree, sometimes as much as eighteen or twenty feet high, bearing its greenish-yellow blossoms in October and November, and its bright yellow and red berries, which are studded with little projections, in November and the succeeding months. The Oriental Arbutus, *A. andrachne*, is superior to the last in beauty both of leaves and flowers, but it is much more tender, and does not bear fruit in Great Britain. It is a native of the Levant. *A. hybrida*, or the mule arbutus, is apparently a hybrid between the two last, agreeing with *A. unedo* in the general aspect of its foliage, which is, however, larger and more handsome, and with *A. andrachne* in flowers and in the deciduous bark. It is hardy, and very ornamental, but it does not bear berries. The other species are chiefly American, and of less general interest.

ARC, from the Latin *arcus*, a bow, signifies any part of a curve line, as A C B. The straight line A B, which joins the extremities of the arc, is called its chord.

The practical method of finding the length of an arc is as follows:—Divide the arc into a number of smaller arcs, making the number large in proportion to the degree of accuracy required, and add together the chords of the smaller arcs. The sum of the chords will differ very little from the



arc, even when the number of sub-divisions is not very large. For instance, the arc of the quadrant of a circle, whose diameter is ten million of inches, is 7,853,982 inches, within half an inch. Divide this quadrant into ten equal parts, and the sum of the chords is 7,845,910 inches: divide the quadrant into fifty parts, and the same sum is 7,853,659 inches, which is not wrong by more than one part out of 24,316. For only twenty sub-divisions the sum of the chords is 7,851,963 inches, wrong only by one part out of 3890. Therefore, for every practical purpose, an arc of a circle (and the same may be said of every other curve) is the polygon made by the chords of a moderate number of sub-divisions of the arc.

ARC, JOAN or JEANNE OF, surnamed the 'Maid of Orleans,' from her heroic defence of that city, was born about the year 1410 or 1411, in the little hamlet of Domremy, near the Meuse, and about three leagues south of Vaucouleurs, on the borders of Champagne. Her parents were humble and honest peasants. It appears from the copious depositions of witnesses from the neighbourhood of Domremy, examined at Joan's trial, that she was unremitting in her prayers and other religious exercises, and was strongly imbued, at a very early age, with the prevailing superstitions of her native place.

During that period of anarchy in France, when the supreme power which had fallen from the hands of a monarch deprived of his reason was disputed for by the rival houses of Orleans and Burgundy, the contending parties carried on war more by murder and massacre than by regular battles. At first the popular feeling was undecided; but when, on the death of Charles VI., the crown fell to a young prince who adopted the Armagnac side, whilst the house of Burgundy had sworn allegiance to a foreigner (Henry V.) as king of France, then, indeed, the wishes and interests of all the French were in favour of the Armagnacs, or the truly patriotic party. Remote as was the village of Domremy, it was still interested in the issue of the struggle. It was decidedly Armagnac, and was strengthened in this sentiment by the rivalry of a neighbouring village which adopted the Burgundian interest.

Political and party interests were thus forced upon the enthusiastic mind of Joan, and mingled with the pious legends which she had caught from the traditions of the Virgin. A prophecy was current, that a virgin should rid France of its enemies; and this prophecy seems to have been realized by its effect upon the mind of Joan. The girl, by her own account, was about thirteen when a supernatural vision first appeared to her. She de-

scribes it as a great light, accompanied by a voice telling her to be devout and good, and promising her the protection of Heaven. Joan responded by a vow of eternal chastity. From that time the voice or voices continued to haunt Joan, and to echo the enthusiastic and restless wishes of her own heart. Her own simple and *early* account was that 'voices' were her visitors and advisers; and that they prompted her to quit her native place, take up arms, drive the foe before her, and procure for the young king his coronation at Rheims. These voices, however, had not influence enough to induce her to set out upon the hazardous mission, until a band of Burgundians, traversing and plundering the country, had compelled Joan, together with her parents, to take refuge in a neighbouring town: when they returned to their village, after the departure of the marauders, they found the church of Domremy in ashes. Such incidents were well calculated to arouse the indignation and excite the enthusiasm of Joan. Her voices returned, and incessantly directed her to set out for France; but to commence by making application to De Baudricourt, commander at Vaucouleurs. Her parents, who were acquainted with Joan's martial propensities, attempted to force her into a marriage; but she contrived to avoid this by paying a visit to an uncle, in whose company she made her appearance before the governor of Vaucouleurs, in May, 1428. De Baudricourt at first refused to see her, and, upon granting an interview, treated her pretensions with contempt. She then returned to her uncle's abode, where she continued to announce her project, and to insist that the prophecy, that 'France, lost by a woman (Isabel of Bavaria), should be saved by a virgin from the frontiers of Lorraine,' alluded to her. She it was, she asserted, who could save France, and not 'either kings, or dukes, nor yet the king of Scotland's daughter'—an expression which proves how well-informed she was as to the political events and rumours of the day.

The fortunes of the Dauphin Charles at this time had sunk to the lowest ebb; Orleans, almost his last bulwark, was besieged and closely pressed, and the loss of the 'battle of Herrings' seemed to take away all hope of saving the city from the English. In this crisis, when all human support seemed unavailing, Baudricourt no longer despised the supernatural aid promised by the damsel of Domremy, and gave permission to John of Metz and Bertram of Poulengy, two gentlemen who had become converts to the truth of her divine mission, to conduct Joan of Arc to the dauphin. They purchased a horse for her, and at her own desire furnished her with male habits, and other necessary equipments. Thus provided, and accompanied by a respectable escort, Joan set out from Vaucouleurs on the 13th of February, 1429. Her progress, through regions attached to the Burgundian interest, was perilous, but she at length safely arrived at Chinon on the eleventh day after her departure from Vaucouleurs.

Charles, though he desired, still feared to accept the proffered aid, because he knew that the instant cry of his enemies would be, that he had put his faith in sorcery, and had leagued himself with the infernal powers. But, after much ceremonial and credulous examination of her claims, her wishes were acceded to, and she received the rank of a military commander. The details of the military proceedings, and her success in raising the siege of Orleans and performing her promise of having Charles crowned at Rheims, belong rather to the histories of France and England than to her biography here. After the coronation it is stated she wished to retire to her native village; but the French court, unwilling to relinquish the support derived from her name, prevailed on her to continue her career. In an attack on Paris she was repulsed and wounded, and while defending Compiegne she was taken prisoner in a sally, conveyed to Rouen, and there, at the earnest demand of the University of Paris, tried on a charge of sorcery, while letters exist proving the extreme reluctance of the English council to proceed to extremities against her. At length, however, the University prevailed, the trial proceeded, and, after several months' interrogatories, the judges who conducted the trial drew from her confessions the articles of accusation; these asserted that Joan pretended to have had visions from the time when she was thirteen years old; to have been visited by the archangels Gabriel and Michael, the saints Catharine and Margaret, and to have been accompanied by these celestial beings to the presence of the Dauphin Charles; that she pretended to know St. Michael from St. Gabriel, and St. Catharine from St. Margaret; that she pretended to reveal the future; and had assumed male attire by the order of God. Upon these charges her accusers wished to convict her of sorcery. Moreover, they drew from her answers that she declined to submit to the ordinances of the church, whenever her voices told her the contrary. This was declared to be heresy and schism, and to merit the punishment of fire.

These articles were despatched to the University of Paris, and all the faculties agreed in condemning such acts and opinions as impious, diabolical, and heretical. This judgment came back to Rouen; but it appears that many of the assessors were unwilling that Joan should be condemned; and even the English in authority seemed to think imprisonment a sufficient punishment. At length she was brought forth on a public scaffold at Rouen, and the bishop of Beauvais proceeded to read the sentence of condemnation, which was to be followed by burning at the stake. Whilst it was reading, every exhortation was used, and, Joan's courage for once failing, she gave utterance to words of contrition, and expressed her willingness to submit, and save herself from the flames. A written form of confession was instantly produced, and read to her, and Joan, not knowing how to write, signed it with a cross. Her sentence was commuted to perpetual imprisonment, 'to the bread of grief and the water of anguish.' She was borne back from the scaffold to prison; whilst those who had come to see the sight displayed the usual disappointment of unfeeling crowds, and even threw stones in their anger.

When brought back to her prison, Joan submitted to all that had been required of her, and assumed her female dress; but when two days had elapsed she heard her voices reproaching her, and under this impulse she seized the male attire which had been perfidiously left within her reach, put it on, and avowed her altered mind, her resumed belief, her late visions, and her resolve no longer to belie the powerful impulses under which she had acted.

The bishop of Beauvais knew that, if Joan were once out of the power of the court that tried her, the chapter of Rouen, who were somewhat favourably disposed, would not again give her up to punishment; and fears were entertained that she might ultimately be released, and gain new converts. It was resolved, therefore, to make away with her at once, and the crime of relapse was considered sufficient. A pile of wood was prepared in the old market at Rouen, and scaffolds placed round it for the judges and ecclesiastics: Joan was brought out on the last day of May, 1431; she wept piteously, and showed the same weakness as when she first beheld the stake. But now no mercy was shown. They placed on her head the cap used to mark the victims of the Inquisition, and the fire soon consumed the unfortunate Joan of Arc. When the pile had burned out, all the ashes were gathered and thrown into the Seine.

It is difficult to say to what party most disgrace attaches on account of this barbarous murder: whether to the Burgundians, who sold the Maid of Orleans; the English, who permitted her execution; the French, of that party who brought it about and perpetrated it; or the French, of the opposite side, who made so few efforts to rescue her to whom they owed their liberation and their national existence. The story of the Maid of Orleans is throughout disgraceful to every one, friend and foe; it forms one of the greatest blots and one of the most curious enigmas in historic record. It has sometimes been suggested that she was merely a tool in the hands of the priests; but this supposition will hardly satisfy those who read with attention the history of Joan of Arc.

The works on the subject of Joan of Arc are very numerous. M. Chaussard enumerates upwards of four hundred, either expressly devoted to her life or including her history. Her adventures form the subject of Voltaire's poem of *La Pucelle*, and of a tragedy by Schiller; but perhaps the best production of the kind is Mr. Southey's poem bearing her name.

ARCADE properly signifies a series of arches on insulated piers, forming a screen, and also the space inclosed by such.

In addition to its proper technical meaning, this term has of late acquired a different signification among us as the popular name for what the Parisians more properly designate a 'passage' or 'galerie,' viz. an alley lined on each side with shops, and roofed over so as to be in fact a sort of in-door street, entirely protected from the weather, and of uniform design throughout in its architecture. As to such a place being a very great public convenience there can be but one opinion,—as in dirty or wet weather, when the advantages attending such mode of building make themselves felt very sensibly. The Burlington Arcade was the first place of the kind in London. Among the Parisian arcades the Passage Colbert is one of the most striking, both for its extent and architectural display, towards which last its Rotunda contributes in no small degree.

ARCA'DIA, one of the ancient provinces of the Peloponnésus, now the Morea, comprising the central part of the peninsula. It extended from about 37° 15′ to 38° N. lat., and from 21° 52′ to 22° 36′ E. long. Its greatest length from Kalávryta, the ancient Cynætha, in the north to Samará in the south, near which it must have been separated from Laconia, was about 50 miles. Its breadth varied from 35 to 41 miles.

On the north and north-west it was separated from Achaia and Elis by a range of mountains, which branching off from Cyllene (now Zyria), the highest point of the Peloponnesus, ran in a westerly direction. On the west it was separated from Triphylia by mountains which are a southerly continuation of Phólöe. On the south, its boundary towards Laconia may be considered the high land from which the water flows in opposite directions, southwards into the Eurotas and northwards into the Alpheius. It was separated from Messenia by the high land west of Lycosúra, running between the bed of the Neda and the sources of the Pamisus, and containing the great mountain Tetrázi (Cerausium), a part of Lycæum. On the east it was separated from Argolis by the ridge known under the several appellations of Parthenium, Artemisium, and Trachy. Its area is calculated by Mr. Clinton ('Fasti Hellenici,' i. 385) at 1701 English square miles, being next in size to Laconia, which was the largest province of the Peloponnesus.

The centre of the Morea may be considered a high table-land, which is traversed by numerous ridges of hills, and it contains the several plains of Tégea, Mantinein, Orchómenus, and Caphyæ. Indeed, these plains may be considered as one, which in length is about twenty-five miles, with a breadth varying from one to eight. The modern town of Tripolitzá is on this elevated plain, where, in the month of March, the ground is often covered with snow, while the sea-coast enjoys warm and pleasant weather. Being now entirely deprived of wood, and of its three great cities, Tegea, Mantinein, and Orchomenus, the extensive plain of Tripolitzá is one dull, uninteresting level. In the south and west, along the valleys of the Alpheius, Arcadia exhibits its most picturesque features. The valley of Megalopolis still abounds in delightful scenery. The sides of the majestic mountains are covered with oaks, chestnuts, and plane-trees, while the lower hills are clothed with underwood, and refreshed by numerous rivulets.

The Alpheius, the principal river of the Peloponnesus, has its source near the southern frontier of Arcadia. [ALPHEIUS.]

The Arcadians were divided into many independent states, and each of these contained several inferior towns or villages. There are now many insignificant villages in Arcadia, but the only

place of any importance is Tripolitzá, which was formerly the chief residence of the Turkish pacha.

(Strabo, p. 388, ed. Casaub.; Pliny, *Hist. Nat.* iv.; Leake's *Morea*; Gell's *Narrative of a Journey in the Morea.*)

ARCADIANS were probably a branch of the great Pelasgic nation, which seems to have extended, at one time, nearly in a continued line from the Italian peninsula to Asia Minor. A strong confirmation of this statement is, that Arcadia contains ancient polygonal walls (such as at Mantinœia, and at Lycosura),—a species of architecture supposed to be peculiar to the Pelasgi; and their first king is reported to have been the earth-born Pelasgus.

In the second Messenian war, B.C. 685-668, we find the Arcadians under the command of a king, Aristócrates, whom they stoned to death on account of his treacherous behaviour to the Messenians. The country was then divided into many small republics. During the invasion of Xerxes, B.C. 480, the Arcadians sent to Thermopylæ 2120 men to oppose the Persian king. In the celebrated Sicilian expedition, B.C. 415, there were Arcadians both in the Athenian and Spartan armies. They do not appear to have acted as a nation till they had founded, under Epaminondas, the city of Megalopolis, B.C. 371, which became the metropolis of the country. Epaminondas and the Bœotians assisted the Arcadians in establishing their new constitution, and in rendering them independent of the power of the Spartans. On the death of Alexander, B.C. 323, the country was a prey to petty tyrants, and the part the Arcadians took in the Achæan league did not enable them to re-establish peace and security. The Romans at last made themselves masters of their country, and included it in the province of Achaia. Strabo, who wrote in the time of Tiberius, states that in his time the country was desolate. Pausanias, who examined Arcadia about A.D. 174, gives a minute account of its ruined cities and of the numerous antiquities with which it abounded.

(Pausanias, book viii.; Thucydides, vii. 57; Xenophon, *Hellenica*, vii.; Diodorus, book xv.; Herodotus, viii. 73, &c.)

ARCA'DIUS, emperor of Constantinople, son of Theodosius the Great, whom he succeeded A.D. 395. He was a mere puppet in the hands of ambitious men, who pursued their own interests without regard to the happiness of the people. Theodosius by his will divided his empire between his two young sons, Arcadius and Honorius. Arcadius became emperor of the east, and reigned over Thrace, Asia Minor, Syria, and Egypt, from the lower Danube to the confines of Persia; Honorius became, at least, nominal emperor of the west. The line which separated the two kingdoms was, in fact, much the same as that which now divides the empire of Austria from Turkey. The accession of Arcadius marked the final establishment of the empire of the east, which subsisted till the taking of Constantinople by the Turks, during a perion of 1058 years.

In the later years of his life, Arcadius was entirely under the control of his wife, Eudoxia, who persecuted St. Chrysostom. Arcadius died May 1, 408, leaving his empire to his infant son, Theodosius.

ARC'ADIUS, CHARISIUS AURE'LIUS. [CHARISIUS.]

ARCESILA'US was born at Pitana, a city of Æolis. He was born B.C. 316, and he died B.C. 241, at the age of seventy-five. He was the pupil of the mathematician Autólycus, his compatriot, and afterwards proceeded to Athens, where it was intended that he should devote his time to the study of rhetoric. Philosophy, however, had greater charms for him, and he became the pupil of Theophrastus the peripatetic, and then of Crantor. He also made himself acquainted with the subtile dialectics of the Megaric school, and the scepticism of Pyrrho. He attached himself more particularly to the Academic sect, and became one of their leading philosophers, though he introduced so many changes that he was considered the founder of what has been called the Middle Academy.

Arcesilaüs revived the Socratic mode of teaching; he propounded no dogmatic principles of his own, but discussed the points proposed to him by his pupils. He brought forward all the arguments that could be suggested on both sides of a question, and endeavoured to prove that there was no certainty in philosophical knowledge, and that in all purely speculative subjects we must refrain from coming to a decision, because the mind of man cannot sufficiently distinguish truth from falsehood. In the world, he admitted, we must act as others do. He was succeeded in his school by Lacýdes, B.C. 241. The reader may consult the fourth book of Cicero's 'Academic Questions' for an eloquent exposition of the arguments for and against the philosophical doctrines of Arcesilaüs.

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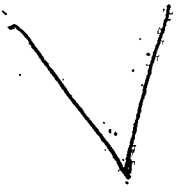

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